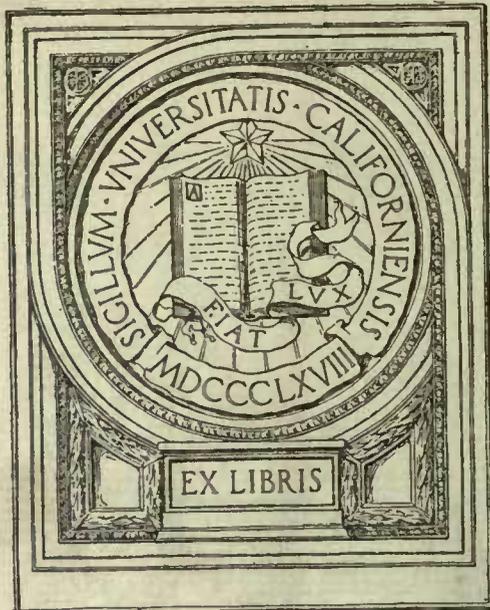


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CATALOGUE

OF

DOUBLE STARS

FROM OBSERVATIONS MADE AT

THE ROYAL OBSERVATORY, GREENWICH.

WITH THE

28-INCH REFRACTOR

DURING THE YEARS 1893-1919,

UNDER THE DIRECTION OF

SIR FRANK WATSON DYSON, LL.D., F.R.S.,
ASTRONOMER ROYAL.



LONDON:

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INTRODUCTION.

MOST of the observations collected and discussed in this volume were made with the 28-inch refractor which was installed at the Royal Observatory by Sir William Christie in 1893. In preparation for the erection of this telescope the 12·8 Merz refractor had been dismantled from the great equatorial and installed in the south grounds of the observatory on the Lassell equatorial in place of the Lassell 2-ft. reflector. With this instrument Mr Lewis began a regular programme of double-star observations. By 1893 October 1 the 28-inch equatorial was erected, but the adjustment of the object-glass and the completion of the fittings at the eye end was not completed till February of the following year. From that time the double-star observations were made with the 28-inch refractor under the direction of Mr Lewis, who drew up the programme of observations. For the first few years Mr Lewis did nearly the whole of the observing himself, and he continued to observe till 1911. He was joined in 1895 by Mr Bowyer, who took an increasing share of the work and observed three nights a week from 1902 to 1914. Regular duties were also taken by Mr Bryant from 1897 to 1903 and again from 1906 onwards, and by Mr Furner from 1902. A considerable number of observations was made by Professor Eddington and Professor Chapman, and a smaller number by other observers. During the war the course of observations was largely interfered with so far as regular members of the staff were concerned. The instrument was, however, placed at the disposal of M. Jonckheere, director of the Lille Observatory, and he completed a series of observations on which he was engaged. These are not included in the present volume, but are published in the *Memoirs* of the Royal Astronomical Society, vol. lxi., and in the *Astronomical Journal*, vol. xxxi. After the war, the telescope was used for a few months in 1919, but was then dismantled for extensive repairs to the mounting.

The Merz refractor was used in 1893 only. It has an aperture of 12·8 inches and a focal length of 17 ft. 10 in. The value of one revolution of the screw was adopted as 19'·35 from transits of fast-moving stars. The eyepieces provided had powers of 285 and 412, but on nearly all occasions the larger power was used. With this instrument Mr Lewis observed about 120 stars mostly on two or three nights. A few observations were also made by Professor Turner. The telescope is now used as the guiding telescope of the 26-inch photographic refractor.

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The 28-inch refractor is carried in the mounting originally designed for the Merz refractor. This mounting, together with the clock-work, is fully described in the Greenwich volume for 1868. The form of the instrument is that known as the "English equatorial." The polar axis consists of a steel framework turning on pivots at its extreme ends. This framework carries the bearings for the declination axis so that the telescope swings within the framework. The clock-work is driven by a turbine supplied by water from a cistern, and is controlled by a conical pendulum.

The 28-inch object-glass was made by Sir Howard Grubb from discs supplied by Messrs Chance of Birmingham. It is of a special form proposed by Sir George Stokes to Sir William Christie as suitable for both visual and photographic work by reversal of the crown lens and change in the separation. When the lenses are in position for visual observations, the radii of curvature of the surfaces beginning at the outside are 146 in. (convex), 134 in. (convex), 138 in. (concave), and 1000 in. (convex), and the separation of the lenses is 0.4 in. at the edges. This combination gives a minimum focal length of 27 ft. 10 in. for $\lambda=5500 \text{ \AA}$. For use as a photographic refractor the crown lens is reversed and the separation increased by 3.5 in. The focal length is thereby shortened by 23 in.

To provide accommodation for the larger telescope Sir William Christie designed a new dome. A description of this is given in the *Monthly Notices*, vol. li. p. 436. The diameter is 31 ft. at a height of 7 ft. above the rail, and contracts to 31 ft. at the base. The shutter opening is 7 ft. wide and extends from the zenith down to the horizon on both sides.

The positions in which the telescope can be used are limited by the framework of the polar axis and also by the fact that near the zenith the eyepiece does not clear the floor. The following short table shows the highest declination that can be reached at different hour angles :—

Hour Angle.	Declination.	Hour Angle.	Declination.
h m	°	h m	°
0 0	30	2 15	44
1 0	32	2 30	50
1 30	36	2 45	65
2 0	40		

The telescope may be used in the zenith by means of a diagonal reflector which can be moved into the centre of the cube about 3 ft. from the eyepiece. A few observations of stars in high declination were made in this manner in 1899.

For observations of position angle the position circle is moved by hand, although a slow motion is provided. The circle is graduated in half degrees and is read to the nearest minute by a vernier. The wires for measuring the separation are moved independently by two micrometers. As the readings of both micrometers increase as the wire is moved towards the screw head, the separation is the difference of the sum of the readings of the micrometers when each wire bisects a star and when the two wires are placed together. The observations of double the separation are actually made by bisecting the star images by the wires, the wires first bisecting the star nearer the screw head and then the star farther away. The difference of the sums of the readings of the two micrometers thus gives the double separation in terms of the common screw value.

The value of one revolution of the screw was determined as $12''.06$ from observations of transits of the stars 2 Ursae Minoris, Bradley 402, and Piazzii II. 60, by Mr Dyson and Mr Lewis on 1894 Dec. 27.

The erection and adjustment of the telescope was completed in 1893. During the first half of 1894 it was thoroughly tested with the crown lens in the position for photographic observation. The telescope was thereafter used as a visual telescope. After various improvements in the accessories of the instrument it was brought into use for regular double-star observation in 1894 September.

Mr Lewis remained in charge of the 28-inch refractor till his retirement in 1917. For the first few years he did most of the observing, and he continued to observe till 1911. The other assistants who did most observing were Mr Bryant (1897–1903, 1906–1919) and Mr Bowyer (1895–1914). Mr Furner observed one night a week from 1902. From 1902 to 1914 Mr Bowyer observed three nights a week. A considerable number of observations were also made by Professor Eddington and Professor Chapman when at Greenwich, and by various other members of the staff.

During the war observations with the 28-inch refractor were practically suspended so far as regular members of the staff were concerned. A large number of observations were made by M. R. Jonckheere, director of the Observatory of the University of Lille during the years 1914–1918. These observations have not been included in this volume, but many of them have been published in *Memoirs of the Royal Astronomical Society*, vol. lxi., and in the *Astronomical Journal*.

The telescope was again used by regular members of the staff for a few months in 1919. It was then found that the bearings for the upper pivots were badly worn and required to be replaced. The instrument was therefore dismantled.

This catalogue contains all the observations of double stars made with this instrument up till 1919 August, except those made by M. Jonckheere.

The observing programme originally consisted of double stars selected from the Dorpat and Pulkowa catalogues and from the various catalogues of Burnham. As new lists of double stars were published, those which appeared to be interesting were added to the programme. In order to make Mr Lewis's work on the Struve double stars as complete as possible an attempt was made to obtain measures of those Struve stars which had not been recently observed.

The separate observations for the years 1893 to 1909 were published in the Greenwich annual volumes. In 1910 this practice was discontinued and the separate observations for the years 1910-1919 are given in the present volume. The collected results for the years 1893 to 1919 form the main part of this volume. In taking the means of the position angles no correction for personality was applied to any of the observers, but small corrections as given below were applied to the measures of distance by a few of the observers.

As Mr Bowyer had observed regularly from 1895 to 1914 his measures were taken as standard, and a comparison of the distance-measures of different observers made for those stars for which the relative motion was small. The stars were divided into classes according to the separation as measured by Mr Bowyer, $0''\cdot0-0''\cdot5$, $0''\cdot5-1''\cdot0$, $1''-2''$, and greater than $2''$. The results are given below where the numbers in brackets indicate the number of measures compared :—

	$0''\cdot0-0''\cdot5$.	$0''\cdot5-1''\cdot0$.	$1''-2''$.	$> 2''$.
WB—L	$-.01$ (368)	$-.01$ (399)	$+.01$ (337)	$-.06$ (221)
WB—B	$-.01$ (365)	$-.04$ (335)	$-.04$ (130)	$+.01$ (57)
WB—HF	$-.13$ (40)	$-.07$ (198)	$+.01$ (250)	$+.01$ (239)
WB—SE	$-.08$ (1)	$-.09$ (20)	$-.20$ (55)	$-.17$ (26)
WB—SC	$-.34$ (6)	$-.20$ (48)	$-.21$ (96)	$-.25$ (55)

It will be seen from this table that the observers who have made most of the observations, L, B, WB, are in essential agreement. No correction for personality has been applied to their observations. The measures of HF under $1''\cdot0$ have been reduced by $0''\cdot10$, while uniform corrections of $-0''\cdot18$ and $-0''\cdot23$ have been applied to the measures of SE and SC. No corrections have been applied to the distance-measures of the other observers.

The form of the catalogue requires little explanation. The first column gives the number in Burnham's *General Catalogue of Double Stars*, and the second column gives the common double-star name. The third and fourth columns give the Right

spectral type, in this volume the hypothetical parallaxes have been made on the uniform assumption that $m_1 + m_2 = 2$.

For systems in which the relative motion has as yet been too small for the determination of orbit elements, it is possible to form an estimate of the parallax. If ρ , θ be the separation and position angle at time t , then the equation of motion for the projected radius sector is

$$\frac{d^2\rho}{dt^2} - \rho \left(\frac{d\theta}{dt}\right)^2 = -\frac{4\pi^2 p^3 (m_1 + m_2) \sin^3 i}{\rho^2},$$

where π is the ratio of the circumference to the diameter of a circle and i is the angle between the actual radius vector and the line of sight. This equation can be written in the form

$$p = \frac{\rho \operatorname{cosec} i}{\sqrt[3]{4\pi^2(m_1 + m_2)}} \left[\left(\frac{d\theta}{dt}\right)^2 - \frac{1}{\rho} \frac{d^2\rho}{dt^2} \right]^{\frac{1}{3}} \quad (2)$$

This equation is very similar to (1) above. The value of the term in square brackets can be derived from the observations if the observed arc is considerable; a mean value of $(m_1 + m_2)$ has to be assumed as in (1), while a simple statistical discussion shows that for a large number of systems the mean value of $\operatorname{cosec} i$ will be $\frac{\pi}{2}$ or 1.57.

The value of this factor cannot be less than 1, and it will exceed twice the mean value only for 1 star in 20. The hypothetical parallax as determined by (2) is deduced in the *Monthly Notices, R.A.S.*, vol. lxxxi. p. 6, in the following form suitable for numerical calculation:—

$$p = \frac{1.34\rho_2}{t_3^{\frac{2}{3}}} \left[\left(\frac{\theta_3 - \theta_1}{360}\right)^2 + \frac{2\rho_2 - \rho_1 - \rho_3}{\pi^2\rho_2} \right]^{\frac{1}{3}},$$

where ρ_1, θ_1 ; ρ_2, θ_2 ; ρ_3, θ_3 refer to times $t_0 - \frac{1}{2}t$, t_0 , $t_0 + \frac{1}{2}t$, and t is reckoned in years, θ in degrees, and ρ in seconds of arc. In cases where the observations are not sufficient to show a change in ρ the second term has been omitted. The value of p so deduced is denoted by p_1 in the notes, while that obtained from the complete formula is denoted by p_2 .

Russell and Hertzsprung have employed a different formula for the determination of hypothetical parallaxes. From the energy equation for elliptic motion it can be shown that $p = a \sqrt[3]{\rho v^2}$, where ρ is the separation of the components, v the annual relative motion in seconds of arc, and a depends on $(m_1 + m_2)$ and certain unknown angles and elements. It is possible to give a statistical mean value for a from which the actual value will differ by a considerable amount in only a small proportion of cases. We assume

$$p_3 = 0.397 \sqrt[3]{\rho v^2}$$

as this factor makes $p_3 = p_1$ for a circular orbit.

For convenience of reference a list of hypothetical parallaxes is given immediately following this introduction. The first table is for double stars for which orbit elements have been computed, and the second table for those for which arcs only are available. Table I. is as complete as possible, and no stars have been rejected because the orbit has been computed from insufficient data, as the elements in all cases fit the observed arc, and this is sufficient for the purpose. Table II. contains only stars discussed in connection with this catalogue. The tables give (1) number in Burnham's Catalogue; (2) spectral type; (3) apparent magnitude, derived from the Harvard volumes and in a few cases from the B.D., reduced to the Harvard Scale by the tables in vol. 72 of the *Harvard Annals*; (4) the absolute magnitude deduced from the apparent magnitude and the hypothetical parallax by means of the formula $M = m + 5 + 5 \log p$; (5) hypothetical parallax; (6) spectroscopic parallax from list of 1646 determinations made at Mount Wilson; (7) absolute trigonometric parallax; (8) number of determinations of trigonometric parallax from which the mean in (7) is derived.

In the *Monthly Notices of the Royal Astronomical Society* for November 1920, Messrs Jackson and Furner have given a discussion of the hypothetical parallaxes of 556 double stars calculated in the course of this work. The present catalogue gives results for 10 additional stars, 2 with orbit elements and 8 with arcs only. The following table gives a comparison of the hypothetical and absolute trigonometric parallaxes as given in that paper:—

	Limits of Hyp. Par.	Hyp. Par.	Abs. Trig. Par.	Hyp.—Trig.	No. of Stars.	Stars with Hyp. < Trig.
Stars with orbits .	> ".050	".137	".152	—".015	29	17
" "	".025 to ".050	.035	.035	.000	20	9
" "	< ".025	.019	.023	—".004	19	13
Stars with arcs only	..	.045	.036	+".009	25	7
All stars . . .	..	.066	.069	—".003	93	46

The following table gives a comparison of the hypothetical with the spectroscopic parallaxes as given by Messrs Adams, Joy, Stromberg, and Miss Burwell in their list of 1646 parallaxes. It replaces the table in the *Monthly Notices* where the spectroscopic parallaxes are taken from the earlier list of 500 parallaxes. The agreement is much better for the stars with hypothetical parallax derived from orbit elements, but the table indicates that the hypothetical parallaxes obtained from short arcs is on the whole too large as compared with the spectroscopic parallaxes.

CATALOGUE OF DOUBLE STARS.

	Limits of Hyp. Par.	Hyp. Par.	Spec. Par.	Hyp.—Spec.	No. of Stars.	Stars with Hyp. < Spec.
Stars with orbits .	> ".050	.106	.109	—".003	32	13
" "	".025 to ".050	.036	.032	+".004	20	10
" "	< ".025	.019	.020	—".001	17	8
Stars with arcs only	> ".050	.075	.054	+".021	15	3
" "	< ".050	.029	.022	+".007	25	8
All stars . . . .	..	.058	.054	+".004	109	42

For 327 stars in the list good proper motions were available. A discussion of these, in which the linear motion of each star was obtained by division of the proper motion by the hypothetical parallax, gave the speed of the solar motion as 19.13 kilometres per second towards R.A. 273°.0, Dec. +33°.8.

A discussion of the absolute magnitudes with regard to spectral type and of the distribution of the stars of different spectral types in space is also given in the *Monthly Notices*.

For 25 stars orbits have been computed. These are given in the last section of this volume. Of these, 23 have been published in the *Monthly Notices*. The orbit of β .G.C. 8380 = Σ 2281 = 73 Ophiuchi is new, while that of β .G.C. 7642 = Σ 2052 has been recomputed with the help of recent observations kindly sent by Mr G. Van Biesbroeck of the Yerkes Observatory.

The preparation of this *Catalogue of Double Stars* was commenced before the outbreak of war. Under Mr Lewis' directions the observations to 1914 were collected. The work was then suspended till 1919. The ledger of the observations was then completed by Mr Jackson and Mr Furner. After discussion of the personal equations of the observers, of which the results are given on p. vi, the measures were combined and the catalogue formed. The notes to the stars were written by Mr Jackson, who is also responsible for the determination of the orbits in the last section.

F. W. DYSON.

1921, May 28.

TABLE I.—*Hypothetical Parallaxes of Double Stars.*
(Stars whose Orbits have been completely determined.)

β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.	β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.
21	A3	6.22	2.0	.014	"	"	"	5365	Fo	6.56	3.6	.026	"	"	"
104	Go	7.70	3.3	.013	"	"	"	5388	Ko	{ 2.61 3.80	{ -0.1 +1.1	.029	{ .044 .016	{ .000	3
314	Go	5.24	3.8	.053	.042	.053	1	5515	F5	7.9	3.9	.016	"	"	"
335	Ko	5.71	4.6	.061	.066	.104	2	5734	Go	{ 4.41 4.87	{ 5.0 5.4	.130	{ .126 .120	{ .158	3
374	F8	7.61	4.5	.024	"	"	"	5765	F5	4.03	3.0	.062	.058	"	"
426	F8	3.64	4.6	.152	{ .132 .151	.186	5	5805	F5	6.99	2.9	.015	.012	"	"
479	Ao	5.76	1.6	.014	"	"	"	5811	F5	5.47	3.2	.036	.044	.057	1
482	Ko	5.60	3.0	.031	"	"	"	5951	F8	6.78	3.6	.023	"	"	"
1015	Go	6.18	3.4	.028	"	"	"	6028	F5	6.81	2.1	.012	"	"	"
1036	A3	4.61	2.3	.034	"	"	"	6158	A5	6.31	2.3	.016	.013	.022	1
1070	{ Ko Ao	{ 2.28 5.08	{ -1.3 1.5	.019	.033	.010	4	6243	Fo	{ 3.65 3.68	{ 3.5 3.5	.092	{ .050 .055	{ .068	3
1144	Fo	6.03	3.1	.025	.025	.075	1	6296	Ko	5.10	2.9	.036	"	"	"
1471	Fo	5.32	0.8	.012	.022	.013	2	6406	F5	{ 5.22 5.22	{ 4.2 4.2	.061	.055	.070	3
1623	F8	8.1	3.8	.014	"	"	"	6524	A5	6.80	3.2	.019	"	"	"
1761	A2	5.92	0.7	.009	"	"	"	6530	Ko	7.36	5.3	.038	"	"	"
2007	G5	7.18	5.8	.053	.029	"	"	6566	Fo	4.92	2.0	.026	"	"	"
2093	F8	7.40	3.5	.017	"	"	"	6578	F2	5.54	2.3	.022	.011	.015	5
2109	G5	4.48	4.9	.119	.219	.196	4	6641	K2	7.26	6.2	.060	{ .069 .069	"	"
2134	Go	6.86	3.6	.023	.023	"	"	6711	F5	7.8	4.0	.017	"	"	"
2154	Go	7.09	4.8	.035	.024	"	"	6780	F8	7.04	3.9	.024	"	"	"
2187	Go	7.72	4.2	.019	"	"	"	6842	Ao	{ 5.11 6.64	{ 1.1 2.6	.016	{ .009	{ .018	2
2381	F5	6.96	3.8	.023	.024	.024	3	6955	A2	{ 4.43 4.83	{ 0.8 1.2	.019	"	"	"
2383	F5	6.70	3.7	.025	.028	.007	1	6999	F8	7.17	3.8	.021	.035	"	"
2535	Fop	5.47	2.8	.029	.017	.022	1	7001	F5	7.24	2.8	.013	.012	.022	1
3474	Go	6.89	3.6	.022	.029	.040	2	7034	G5	4.64	5.3	.134	{ .158 .105	{ .178	2
3559	A2	4.89	1.5	.021	"	"	"	7120	Go	4.86	4.4	.082	{ .072 .066	"	"
3596	Ao	-1.58	1.7	.446	.380	.376	2	7251	Go	{ 5.58 6.08	{ 4.4 4.9	.059	.055	.084	2
3876	F5	6.44	3.2	.022	"	"	"	7259	Ko	6.66	3.9	.028	{ .035† .032	{ .046	3
4122	Ao	{ 1.99 2.85	{ 1.8 2.7	.093	.091*	.079	5	7332	Ko	6.8	5.2	.047	{ .055 .055	{ .046	1
4187	F5	0.48	2.7	.280	.347	.309	5	7368	Ao	3.93	1.3	.029	"	"	"
4310	Go	5.34	4.5	.067	.079	.079	3	7416	F2	6.60	2.4	.014	"	"	"
4355	F8	6.44	2.7	.018	"	"	"	7487	F8	{ 4.77 5.07	{ 3.0 3.4	.045	{ .044 .036	{ .046	2
4414	G5	7.9	5.5	.033	.008	.088	1	7561	K5	8.5	6.3	.036	"	"	"
4477	Go	{ 5.56 6.02 6.26	{ 3.8 4.2 4.5	.044	{ .038 .048	.038	3	7563	F5	{ 5.76 6.66	{ 4.6 5.5	.059	{ .032 .038	{ .044	2
4570	Ao	6.35	2.4	.016	"	"	"								
4771	F8	3.48	0.8	.030	{ .052† .016	.017	4								
4923	F8	4.87	3.8	.062	"	"	"								
5005	Ko	7.26	5.8	.051	.052	.067	3								
5103	Go	5.52	2.8	.028	"	"	"								
5223	A2	4.54	-0.2	.011	"	"	"								
5235	A2	5.16	1.5	.019	"	"	"								

* β .G.C. 4122. The Spec. Par. is for star C.

† β .G.C. 4771. Spec. Par. ".052 for AB, ".016 for C.

‡ β .G.C. 7259. Spec. Par. ".035 for μ^1 Boötis, ".032 for μ^2 Boötis.

TABLE I.—*Hypothetical Parallaxes of Double Stars.*
 (Stars whose Orbits have been completely determined)—*continued.*

β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.	β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.
7642	G5	7.0	5.3	.045	.058	.088	1	10363	F5	3.72	1.9	.043	.046	.027	4
7649	A0	3.85	1.8	.038	..	..	..	10533	B5	4.47	0.9	.020	..	..	..
7717	Go	3.00	3.0	.101	.076	.114	5	10559	F	5.99	2.4	.019	..	..	..
7748	K5	7.8	5.1	.030	..	..	..	10643	F5	5.29	2.1	.023	.019	.019	2
7783	F5	6.81	3.3	.020	.022	.024	3					.015	..	..
7878	F5	{ 5.80 5.83	{ 4.1 4.1	.045	{ .028 .026	..	..	10732	K5	{ 5.57 6.28	{ 7.8 8.5	.276	.347	.307	5
7929	K5	5.89	6.3	.123	..	..	..	10829	F5	4.61	3.8	.067	.060	.053	3
7936	..	7.9	3.0	.010	..	..	..	10846	F0	3.82	2.5	.055	.042	.042	5
8038	G	5.34	4.4	.066	.063	.065	2	11222	F5	4.27	2.6	.046	.030	.038	5
8099	F	5.31	4.1	.057	.055	.084	4	11743	F5	{ 4.42 4.59	{ 2.7 2.8	.045	.025	.036	1
8162	{ G5 Mb	{ 3.48 9.7	{ 3.1 9.3	.084	.110	.105	5	11761	Mb	9.2	10.2	.157	.200	.261	4
8303	F	{ 5.34 6.04	{ 2.6 3.3	.028	..	..	..	11763	F	5.47	2.1	.021	.011	..	..
8340	{ K0 K6	{ 4.07 6.05	{ 5.4 7.4	.183	{ .200 .174	.187	5	12143	A	5.56	2.4	.023	..	..	..
8353	..	7.5	4.9	.030	..	..	..	12196	G5	4.56	1.6	.026	.011	.014	1
8372	F8	5.21	4.2	.062	.069	.045	5	12290	G5	8.2	5.6	.030	.030	.011	4
8380	F2	5.67	2.4	.022	..	..	..	12404	F5	6.82	3.0	.018	..	..	..
8679	F8	6.47	3.6	.026	.032	.035	1	12696	..	8.6	6.2	.034	..	..	..
8933	Go	5.21	4.3	.064	.083	.095	4	12701	Go	5.85	5.2	.074	.091	.096	5
8965	A2	2.71	1.6	.059	..	..	..	12755	G5	6.10	4.7	.051	.060	.036	1
8966	A2	6.31	1.5	.011	..	..	..	1 ^h , 37	G5	{ 6.00 6.03	{ 6.6 6.6	.132	..	..	..
9114	G5	8.0	4.6	.021	{ .029 .026	.026	2	9, 40	F5	3.64	2.7	.065	..	..	..
9319	F8	7.3	3.6	.018	..	..	..	12, 61	A0	2.38	0.5	.043	..	..	..
9605	A	2.97	0.8	.036	..	..	..	14, 59	{ Go K5	{ 0.33 1.70	{ 4.7 6.1	.762	..	..	..
9643	A2	4.95	2.3	.030	..	..	..	15, 55	B3	2.95	0.2	.028	..	..	..
9650	F5	6.52	2.8	.018	.017	.021	1	18, 113	F8	{ 5.01 5.01	{ 4.2 4.2	.068	..	..	..
9739	..	7.36	4.5	.027	..	..	..					
9979	G5	7.1	3.6	.020	.030	.049	1								

TABLE II.—*Hypothetical Parallaxes of Double Stars.*
(Stars of which only a small part of the Orbit has been observed.)

β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.	β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.
70	F5	6.30	0.7	.008	"	"	"	1623	F8	8.1	4.7	.021	"	"	"
260	B8	4.88	-0.5	.008	"	"	"	1639	G0	7.30	4.2	.024	"	"	"
322	F8	8.6	6.1	.031	"	"	"	1678	G0	8.3	4.3	.016	"	"	"
374	F8	7.61	5.3	.035	"	"	"	1774	F0	6.83	1.6	.009	"	"	"
431	G0	7.62	2.0	.008	"	"	"	1799	F5	6.85	3.8	.024	"	"	"
440	F5	8.02	4.2	.017	"	"	"	1834	B1	3.94	-0.4	.014	"	"	"
456	"	8.4	4.1	.014	"	"	"	2007	G5	7.18	5.3	.043	.029	"	"
479	A0	5.76	2.0	.018	"	"	"	2027	G5	7.10	5.5	.047	"	"	"
489	B9	5.54	1.0	.012	"	"	"	2034	F8	8.4	3.1	.009	"	"	"
508	A0	6.41	1.7	.011	"	"	"	2041	F8	7.47	4.6	.026	"	"	"
600	B8	4.28	-0.9	.009	"	"	"	2050	G0	9.0	3.9	.010	"	"	"
614	F5	6.88	2.9	.016	"	"	"	2115	F5	7.48	2.2	.009	"	"	"
707	F5	6.01	2.1	.016	"	"	"	2146	B9	5.98	-0.4	.005	"	"	"
714	F0	6.89	0.8	.006	"	"	"	2161	A2	6.90	3.8	.024	"	"	"
830	F8	6.94	3.0	.016	"	"	"	2163	F5	5.81	4.4	.053	"	"	"
887	A2	6.14	3.3	.026	"	"	"	2172	A2	5.06	0.2	.011	"	"	"
898	F5	8.1	4.0	.015	"	"	"	2200	G0	7.72	4.8	.026	"	"	"
900	K0	8.9	5.0	.017	"	"	"	2255	F2	6.81	2.4	.013	"	"	"
926	F8	8.1	3.9	.014	"	"	"	2270	A2	7.4	1.6	.007	"	"	"
941	A2	5.99	1.8	.015	"	"	"	2272	G0	8.4	5.0	.021	"	"	"
946	F2	8.7	5.0	.018	"	"	"	2279	F0	5.44	2.0	.020	"	"	"
981	F0	7.67	3.3	.013	"	"	"	2284	F0	6.49	3.4	.024	"	"	"
992	F5	8.3	3.0	.009	"	"	"	2307	F8	7.8	4.6	.023	"	"	"
1002	F2	7.27	1.8	.008	"	"	"	2336	G5	8.16	6.3	.043	"	"	"
1039	A3	7.8	2.1	.007	"	"	"	2443	F5	8.2	4.3	.016	"	"	"
1061	A2p	{ 4.33 5.23 3.3 }	{ 2.4 3.0 }	.042	"	"	"	2445	F5	6.00	4.2	.045	.020	.002	I
1074	F5	5.68	3.0	.028	"	"	"	2446	G	8.82	7.5	.055	"	"	"
1137	G0	5.20	1.3	.017	"	"	"	2464	G5	7.95	3.9	.016	"	"	"
1212	"	8.8	4.3	.013	"	"	"	2466	A5	8.8	3.6	.009	"	"	"
1235	B8	7.11	2.6	.012	"	"	"	2509	A2	6.46	1.7	.011	"	"	"
1346	K0	7.05	2.2	.010	"	"	"	2535	F0p	5.47	3.3	.037	.017	.022	I
1365	F5	8.1	4.6	.020	"	"	"	2544	A3	5.97	1.6	.013	"	"	"
1386	F5	5.73	4.1	.046	.036	"	"	2588	{ A2 G }	{ 6.25 6.25 }	0.5	.007	"	"	"
1405	F0	7.06	3.3	.018	"	"	"	2609	F5	8.2	3.5	.012	"	"	"
1420	F2	7.9	4.3	.019	"	"	"	2613	B3	7.5	2.9	.012	"	"	"
1427	G0	6.95	5.1	.043	"	"	"	2706	F5	6.11	2.8	.022	"	"	"
1445	A2	7.15	3.4	.018	"	"	"	2731	B9	7.3	3.4	.017	"	"	"
1459	B9	6.42	1.2	.009	"	"	"	2751	A0	5.44	2.2	.022	"	"	"
1501	K0	7.62	0.8	.004	"	"	"	2780	B3	4.32	0.7	.019	"	"	"
1508	A3	6.68	1.8	.011	"	"	"	2812	F5	8.0	3.0	.010	"	"	"
1512	A2	{ 5.55 5.25 }	{ 2.1 1.8 }	.020	"	"	"	2826	F8	7.10	2.9	.014	"	"	"
1517	F0	7.38	1.9	.008	"	"	"	2835	F8	6.74	4.9	.028	"	"	"
1559	B8	{ 6.11 6.11 }	{ -1.7 -1.7 }	.003	"	"	"	2845	B8	5.70	1.3	.013	"	"	"
1584	F0	7.8	3.4	.014	"	"	"	2857	A2	5.49	0.3	.009	"	"	"
1594	G0	7.43	3.0	.013	"	"	"	2866	B9	7.33	1.8	.008	"	"	"
1598	G0	8.1	3.1	.010	"	"	"	2883	B0	3.78	-1.1	.010	"	"	"
								2902	B0	{ 2.05 4.21 }	{ -1.9 0.2 }	.016	"	"	"

TABLE II.—*Hypothetical Parallaxes of Double Stars.*
 (Stars of which only a small part of the Orbit has been observed)—*continued.*

β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.	β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.
7554	F5	8.5	3.9	.012	"	"	..	8241	A2	6.14	-0.5	.005	"	"	..
7587	{ A5 G }	{ 7.86	1.7	.006	..	..	..	8242	G5	8.1	4.7	.021	..	..	..
7619	..	8.9	4.2	.011	..	..	..	8321	A3	7.82	2.2	.007	..	..	..
7632	G5	5.64	0.1	.008	..	..	..	8326	..	8.4	2.7	.007	..	..	..
7634	G5	2.89	0.6	.034	.036	.019	2	8331	F2	7.22	3.2	.016	..	..	..
7637	A3	6.68	1.2	.008	..	..	..	8337	..	8.6	2.0	.005	..	..	..
7651	A0	8.1	2.7	.008	..	..	..	8368	..	10.4	5.8	.012	..	..	..
7673	G5	7.17	1.5	.007	..	..	..	8370	A2	7.40	1.3	.006	..	..	..
7703	A0	5.64	1.6	.015	..	..	..	8384	F5	7.6	1.8	.007	..	..	..
7739	F2	6.76	0.7	.006	..	..	..	8398	{ F2 A0 }	{ 6.14	0.8	.009	..	..	..
7751	G5	8.9	4.1	.011	..	..	..	8421	A2	8.2	2.1	.006	..	..	..
7759	Go	7.27	3.8	.020	..	..	..	8433	F2	7.88	4.5	.021	..	..	..
7777	A0	5.47	0.2	.009	..	..	..	8485	F5	6.51	4.1	.033	..	..	..
7778	F8	6.77	2.1	.012	.017	.001	1	8507	G5	7.13	5.2	.041	..	..	..
7779	A2p	4.86	2.6	.035	..	..	..	8543	A3	6.90	0.5	.005	..	..	..
7817	Go	8.5	4.1	.013	..	..	..	8548	A0	6.20	1.6	.012	..	..	..
7831	..	8.9	4.1	.011	..	..	..	8574	A2	4.85	1.9	.026	..	..	..
7834	F0	6.44	2.5	.016	..	..	..	8575	G5	7.24	1.3	.006	..	..	..
7837	A0	6.24	2.7	.020	..	..	..	8584	B9	6.82	1.3	.008	..	..	..
7863	Go	8.34	5.3	.025	..	..	..	8615	B9	7.9	3.4	.013	..	..	..
7878	F5	{ 5.80 5.83 }	{ 4.8 4.8 }	.062	{ .026 .028 }	..	..	8622	F5	7.34	2.5	.011	..	..	..
7885	A2	2.63	-1.3	.016	..	..	..	8659	A2	7.37	2.1	.009	..	..	..
7898	Ko	7.16	5.9	.057	..	..	..	8662	Ko	5.76	1.0	.011	..	..	..
7914	Mb	3.48	0.2	.022	{ .007 .018 }	.004	2	8663	Go	6.17	3.9	.035	..	..	..
7936	Mb	5.39	0.9	.012	..	..	..	8751	Go	7.7	3.4	.014	..	..	..
7955	..	8.9	3.7	.009	..	..	..	8776	A0	5.72	0.8	.010	..	..	..
7965	Ko	8.8	5.2	.019	..	..	..	8861	F8	8.1	1.8	.006	..	..	..
8003	A0	{ 4.52 5.47 }	{ 0.6 1.6 }	.017	..	..	..	8905	A0	6.83	1.7	.009	..	..	..
8004	..	9.3	4.8	.012	..	..	..	8909	Go	7.7	3.7	.016	..	..	..
8008	..	8.7	6.1	.030	..	..	..	8930	A0	7.34	1.5	.007	..	..	..
8017	F0	7.61	6.4	.057	..	..	..	8986	{ G5 G5 }	{ 8.5 8.5 }	{ 5.9 5.9 }	.030	..	..	..
8028	..	9.1	6.1	.025	..	..	..	8988	G5	7.46	2.6	.011	..	..	..
8055	B8	7.7	2.1	.008	..	..	..	9023	..	8.3	4.8	.020	..	..	..
8100	A0	6.66	0.6	.006	..	..	..	9038	Ko	8.2	4.3	.016	..	..	..
8118	F5	7.34	4.1	.023	..	..	..	9043	F0	7.10	6.7	.081	..	..	..
8120	F5	5.58	3.6	.040	..	..	..	9054	Ko	8.8	3.2	.007	..	..	..
8127	A2	6.97	1.2	.007	..	..	..	9056	A0	8.0	2.7	.009	..	..	..
8145	F5	6.83	3.1	.018	..	..	..	9114	G5	7.51	5.7	.043	{ .029 .026 }	.026	2
8153	Ko	7.9	4.8	.024	..	..	..	9124	F0	8.3	3.4	.010	..	..	..
8163	A0	5.58	0.4	.009	..	..	..	9155	G5	8.1	3.4	.011	..	..	..
8167	K2	8.6	7.5	.059	..	..	..	9173	A2	8.1	2.8	.009	..	..	..
8186	F2	7.7	2.5	.009	..	..	..	9279	F8	8.7	3.5	.009	..	..	..
8203	Go	8.1	3.4	.011	..	..	..	9298	F5	7.9	4.5	.021	..	..	..
8210	Ko	6.54	1.8	.011	..	..	..	9318	A	8.5	6.3	.037	..	..	..
8228	A5	8.1	1.2	.004	..	..	..	9381	..	8.3	5.8	.032	..	..	..
8230	..	7.9	3.1	.012	..	..	..	9415	G5	7.20	1.1	.006	..	..	..
								9450	A3	8.3	3.2	.009	..	..	..

TABLE II.—*Hypothetical Parallaxes of Double Stars.*
(Stars of which only a small part of the Orbit has been observed)—*continued.*

β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.	β .G.C.	Spec. Type.	Mag.	Abs. Mag.	Hyp. Par.	Spec. Par.	Abs. Trig. Par.	Wt.
9456	G0	7.9	3.1	.011	"	"	"	11042	A5	7.7	3.4	.014	"	"	"
9459	A	8.6	2.9	.007	"	"	"	11051	F5	7.11	4.5	.030	"	"	"
9500	F2	7.22	2.7	.012	"	"	"	11125	F5	6.80	3.3	.020	.021	.017	2
9565	A0	6.72	-0.8	.003	"	"	"	11168	G	8.0	2.6	.008	"	"	"
9570	F5	7.30	2.5	.011	"	"	"	11210	F5	8.0	4.3	.018	"	"	"
9602	K0	8.5	7.2	.056	.032	.041	1	11214	F5	{4.73 6.08}	{3.9 5.2}	.068	.058	.046	1
9634	{F2 A2}	{5.70	0.1	.007	"	"	"	11246	F2	7.68	2.6	.010	"	"	"
9686	"	8.4	5.3	.024	"	"	"	11346	G5	7.92	4.6	.021	"	"	"
9712	F8	7.04	4.3	.028	"	"	"	11490	G0	7.58	2.0	.008	"	"	"
9719	F2	6.45	3.0	.021	"	"	"	11556	A2	7.9	2.4	.008	"	"	"
9724	K0	3.90	3.3	.075	.100	.076	3	11590	A0	6.60	1.1	.008	"	"	"
9782	A2	6.48	-0.1	.005	"	"	"	11599	F5	7.10	2.6	.013	"	"	"
9783	A5	7.12	0.8	.005	"	"	"	11650	F5	8.7	3.9	.011	"	"	"
9833	F0	5.32	0.6	.011	"	"	"	11687	"	10.0	6.2	.017	"	"	"
9921	A5	9.8	4.4	.008	"	"	"	11690	F5	6.13	3.8	.034	.040	.060	1
9926	F5	6.38	2.4	.016	"	"	"	11691	A0	5.85	1.6	.014	"	"	"
9944	G0	8.8	4.6	.014	"	"	"	11715	G0	{6.35 6.57}	{5.5 5.7}	.067	.038	"	"
9994	A0	6.57	-0.3	.004	"	"	"	11732	F8	9.0	2.7	.006	"	"	"
10017	A0	6.48	2.6	.016	"	"	"	11736	K0	7.19	4.0	.023	"	"	"
10072	F8	8.4	3.3	.010	"	"	"	11741	K0	8.3	5.9	.033	"	"	"
10147	F8	8.8	3.9	.011	"	"	"	11743	F2	{4.42 4.59}	{3.5 3.7}	.066	{.025 .028}	.036	1
10160	F2	8.4	3.8	.012	"	"	"	11763	F5	5.47	2.5	.026	.011	"	"
10213	G5	7.67	4.2	.020	"	"	"	11908	G0	8.3	5.5	.027	"	"	"
10281	{A0 A0}	{7.04 7.26}	{-0.2 0.0}	.004	"	"	"	11943	"	9.5	7.0	.032	"	"	"
10310	"	8.3	3.3	.010	"	"	"	11968	G0	6.75	4.3	.032	"	"	"
10423	B8	5.93	-0.3	.006	"	"	"	11979	B9	7.26	1.4	.007	"	"	"
10461	F8	8.56	4.4	.015	"	"	"	12036	A0	5.62	3.0	.030	"	"	"
10483	A0	6.70	2.4	.014	"	"	"	12065	A3	6.46	2.5	.016	"	"	"
10487	G	8.5	3.6	.010	"	"	"	12094	F0	5.79	2.4	.021	"	"	"
10504	K0	7.04	4.7	.033	{.040 .026}	.016	1	12104	F5	8.6	4.0	.012	"	"	"
10506	G8	4.34	0.6	.032	.024	.014	1	12125	A2	5.08	0.7	.013	"	"	"
10519	G5	8.16	3.4	.011	"	"	"	12178	F2	7.47	3.1	.014	"	"	"
10533	B5	4.47	0.5	.016	"	"	"	12228	F2	8.8	4.5	.013	"	"	"
10607	G5	8.0	4.4	.019	"	"	"	12317	K5	8.6	7.2	.054	"	"	"
10608	G0	7.38	3.6	.018	"	"	"	12432	K2	5.21	1.1	.015	.009	"	"
10643	F5	5.29	3.1	.037	{.019 .015}	.019	2	12468	B9	5.86	0.6	.009	"	"	"
10685	F5	6.50	3.1	.021	"	"	"	12510	A0	7.25	2.9	.014	"	"	"
10690	F0	7.50	2.7	.011	"	"	"	12531	F2	8.00	3.5	.012	"	"	"
10709	G0	8.1	5.3	.027	"	"	"	12532	K0	4.98	0.9	.015	.017	"	"
10749	A2	6.68	1.4	.009	"	"	"	12562	B3	5.84	1.3	.012	"	"	"
10773	A0	5.57	1.4	.015	"	"	"	12563	G	7.8	3.2	.012	"	"	"
10809	F8	8.0	3.7	.014	"	"	"	12675	F8	{6.58 6.58}	{5.0 5.0}	.049	"	"	"
10841	G5	7.17	1.2	.006	"	"	"	12709	G0	7.7	4.9	.028	"	"	"
10871	A2	7.87	2.7	.008	"	"	"	12731	"	7.2	1.2	.004	"	"	"
10910	F8	7.9	5.1	.027	"	"	"	12740	K2	8.62	8.6	.098	.096	.102	4
10922	G5	6.44	3.2	.022	"	"	"	12750	K0	8.8	5.8	.025	"	"	"
11001	F2	6.70	3.6	.023	"	"	"								

Dept. of
Astronomy

ROYAL OBSERVATORY, GREENWICH.

SEPARATE OBSERVATIONS

OF

DOUBLE STARS.

1910-1919.

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Σ 3056				$O\Sigma$ 2— <i>continued.</i>				$O\Sigma$ 15		
	A-B										
1912-97	145 ^o 0	0 ^o 52	WB	1912-96	33 ^o 7	0 ^o 53	WB	1913-96	321 ^o 0	0 ^o 25	B
	A-C			12-97	31 ^o 2	0 ^o 57		14-06	313 ^o 7	0 ^o 11	
1912-97	0 ^o 1	23 ^o 31	WB	13-83	28 ^o 7	0 ^o 68		15-10	304 ^o 8	0 ^o 19	
	β 862				$\frac{AB}{2}$ -C			15-11	318 ^o 2	0 ^o 17	
1912-97	128 ^o 6	0 ^o 42	WB	12-96	224 ^o 9	18 ^o 03	WB		Σ 42		
	Σ 3058			12-97	224 ^o 7	18 ^o 20		1912-80	26 ^o 3	5 ^o 64	WB
1912-96	51 ^o 5	12 ^o 31	WB	13-02	225 ^o 2	17 ^o 92			Hu. 411		
12-97	51 ^o 3	12 ^o 45		14-91	223 ^o 5	18 ^o 41	HJ	1911-83	104 ^o 3	0 ^o 65	WB
	$O\Sigma$ 547				β 998			11-95	99 ^o 1	0 ^o 63	
1913-88	140 ^o 3	5 ^o 01	SC	1912-96	111 ^o 9	1 ^o 05	WB	11-97	100 ^o 8	0 ^o 69	
	Σ 3061			13-83	112 ^o 8	1 ^o 08			$O\Sigma$ 18		
1912-96	147 ^o 8	7 ^o 62	WB		β 1027			1910-93	147 ^o 6	1 ^o 29	L
12-97	147 ^o 7	7 ^o 35		1912-96	186 ^o 1	1 ^o 34	WB		Hn. 3		
	Σ 3060			12-97	181 ^o 1	1 ^o 65		1913-82	55 ^o 0	3 ^o 27	SC
1910-83	120 ^o 1	3 ^o 58	WB		Σ 19			14-09	56 ^o 4	3 ^o 13	
10-85	120 ^o 3	3 ^o 30		1912-97	132 ^o 5	2 ^o 11	WB	14-72	55 ^o 8	3 ^o 12	
11-83	120 ^o 7	3 ^o 43		14-09	138 ^o 1	1 ^o 57	HF		Hu. 413		
11-85	120 ^o 0	3 ^o 43			Küstner 4			1911-02	243 ^o 6	0 ^o 82	HF
12-79	120 ^o 5	3 ^o 49		1911-83	131 ^o 6	2 ^o 23	WB	11-94	245 ^o 5	0 ^o 73	
12-80	117 ^o 5	3 ^o 27		11-87	132 ^o 2	2 ^o 01			Σ 60		
12-86	119 ^o 6	3 ^o 49			Σ 25			1910-66	238 ^o 7	6 ^o 50	L
	Σ 3062			1913-02	185 ^o 6	1 ^o 33	WB	12-97	247 ^o 2	6 ^o 54	WB
1913-73	12 ^o 7	1 ^o 68	B	13-83	192 ^o 4	1 ^o 22		14-09	252 ^o 3	6 ^o 49	SC
	Hu. 401			13-99	179 ^o 4	1 ^o 59		15-61	252 ^o 1	6 ^o 87	HF
1913-79	216 ^o 7	0 ^o 78	B		H. 1016				β 495		
	Küstner 3			1914-09	179 ^o 2	6 ^o 51	SC	1910-03	217 ^o 4	0 ^o 52	B
1911-83	82 ^o 3	0 ^o 98	WB		β 1093			10-07	214 ^o 0	0 ^o 74	
11-92	80 ^o 0	1 ^o 01		1911-09	65 ^o 6	0 ^o 33	B	12-79	217 ^o 3	0 ^o 53	WB
11-95	80 ^o 1	0 ^o 90		11-81	74 ^o 3	0 ^o 34		12-82	214 ^o 8	0 ^o 74	
	B.D.+19 ^o , 5			13-96	66 ^o 0	0 ^o 29			β 232		
1911-92	48 ^o 8	2 ^o 32	WB	14-06	67 ^o 6	0 ^o 22		1911-09	46 ^o 5	0 ^o 17	B
11-95	48 ^o 2	3 ^o 18			Espin 42			14-06	312 ^o 9	0 ^o 09	
	β 253			1911-83	β 779				β 1		
1911-09	51 ^o 7	0 ^o 62	B	11-95	254 ^o 9	0 ^o 68	WB		A-B		
	Krueger 1			12-86	262 ^o 1	0 ^o 81		1914-09	86 ^o 2	1 ^o 71	SC
1911-93	187 ^o 5	2 ^o 41	SC		$O\Sigma$ 12				A-C		
	Σ 7			1910-07	150 ^o 8	0 ^o 45	B	1914-09	138 ^o 0	4 ^o 26	SC
1911-93	216 ^o 0	1 ^o 65	SC	10-11	152 ^o 3	0 ^o 40		1914-09	192 ^o 3	8 ^o 94	SC
	β 255			13-12	149 ^o 8	0 ^o 41			A-E		
1912-96	92 ^o 2	0 ^o 59	WB	13-96	157 ^o 2	0 ^o 60		1914-09	333 ^o 3	16 ^o 00	SC
12-97	92 ^o 0	0 ^o 57		14-06	156 ^o 4	0 ^o 49			Σ 67		
	$O\Sigma$ 2			15-10	166 ^o 4	0 ^o 48		1910-83	1 ^o 9	1 ^o 64	WB
1910-74	38 ^o 0	0 ^o 48	WB	15-11	154 ^o 8	0 ^o 40		11-83	1 ^o 8	1 ^o 94	
10-90	37 ^o 0	0 ^o 43			Hu. 1010			11-85	0 ^o 2	2 ^o 17	
12-79	34 ^o 8	0 ^o 35		1911-93	81 ^o 5	1 ^o 58	SC	12-80	0 ^o 0	1 ^o 82	
					Ho. 212			12-82	1 ^o 6	1 ^o 83	
				1913-79	235 ^o 1	0 ^o 28	B	13-02	353 ^o 7	2 ^o 17	
				13-96	241 ^o 5	0 ^o 24		13-83	0 ^o 1	1 ^o 74	
				14-06	247 ^o 6	0 ^o 13		13-99	359 ^o 1	1 ^o 79	
								11-94	0 ^o 6	2 ^o 00	HF

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Hu. 802				O Σ 21				Σ 122— <i>continued.</i>		
1915-10	196.9	0.19	B	1914-06	117.1	0.25	B	1910-00	324.2	5.94	HF
15-11	222.6	0.27						11-02	328.0	5.85	
	O Σ 20				Ho. 213			13-89	331.0	5.86	
1910-03	302.3	0.52	B	1910-03	198.5	0.33	B	14-01	323.8	5.91	
10-07	304.1	0.36		10-07	197.1	0.25			Espin 451		
13-96	306.4	0.42		13-96	219.0	0.36		1914-09	69.0	2.70	SC
	Σ 73			14-06	213.5	0.30			Ho. 9		
1911-83	35.1	0.85	WB	15-11	213.1	0.30		1910-83	92.0	2.44	WB
11-85	36.7	0.81			β 1228				Espin 4		
11-92	34.9	0.81		1911-92	266.1	0.76	WB	1914-09	108.5	3.49	SC
12-97	36.9	0.85		11-02	271.5	0.72	HF		Σ 133		
12-99	35.6	0.86		13-89	273.9	0.74		1914-08	184.3	2.98	HF
12-86	33.1	0.86	HF	14-85	270.8	1.02		1914-08	190.2	28.23	HF
13-89	37.6	0.80		11-82	263.5	0.92	SC		O Σ 31		
14-09	35.5	1.02			A. 932			1911-02	83.7	3.96	HF
14-85	35.9	0.88		1913-82	353.1	0.80	SC	13-89	81.4	3.44	
11-82	38.2	1.10	SC		O Σ 515				β 507		
13-88	40.5	1.16		1910-03	228.3	0.28	B	1911-95	332.2	2.15	HF
14-88	32.0	0.77	HJ	10-07	215.9	0.18		13-89	350.0	2.35	
	Σ 75			10-11	217.9	0.26		14-09	335.9	2.19	
1911-82	273.0	4.92	SC	13-12	210.2	0.27			Σ 138		
	β 1099			13-96	207.8	0.28		1910-83	43.8	1.47	WB
1910-11	327.9	0.17	B	14-06	215.5	0.15		10-93	39.9	1.27	
15-10	336.5	0.29		15-10	197.0	0.33		11-83	42.7	1.55	
15-11	319.6	0.13		15-11	207.4	0.31		11-85	44.3	1.63	
	Hn. 4				A. 655			13-02	42.2	1.32	
1913-82	132.8	1.01	SC	1910-03	146.2	0.33	B	13-83	43.2	1.58	
	β 302			10-07	137.9	0.25		13-84	39.5	1.50	
1910-03	108.7	0.60	B	15-10	136.9	0.31		14-01	41.0	1.23	
10-07	109.2	0.51		15-11	143.7	0.22		14-01	36.5	1.12	HF
11-09	118.8	0.56			β 398			13-88	41.8	2.17	SC
13-96	108.4	0.61		1913-82	47.8	2.09	SC		β 870		
13-88	106.7	0.59	SC		Σ 102			1914-09	55.3	1.12	SC
14-85	120.8	0.78	HF	1910-66	304.9	0.76	L		β 509		
	Σ 78				Dawes 8			1910-01	239.4	0.83	L
1911-02	243.9	5.01	HF	1914-09	145.2	3.20	SC	11-02	244.4	0.84	HF
11-94	248.0	4.82			Σ 113			11-94	248.1	0.85	
13-89	244.8	4.80		1910-00	1.0	1.37	HF	14-01	253.4	0.99	
14-85	244.6	5.04		11-02	0.0	1.61			Σ 149		
	β 867			14-01	355.6	1.20		1911-08	105.8	1.16	WB
1910-06	171.2	0.93	HF		β 4			1910-01	239.4	0.83	L
11-02	177.9	0.95		1911-09	72.7	0.36	B	11-02	244.4	0.84	HF
11-94	174.6	0.89		15-13	63.9	0.33		11-94	248.1	0.85	
12-86	179.9	0.80		12-82	60.2	not > 0.2	WB	14-01	253.4	0.99	
13-89	167.3	0.68		13-84	60.6	0.31			Σ 155		
14-85	172.4	0.86			Σ 115			1910-01	327.3	4.63	L
11-82	172.1	1.37	SC	1914-09	147.4	1.21	SC		Σ 157		
	Σ 82				A. C. 14			1911-08	114.8	12.42	WB
1910-06	299.2	1.61	HF	1914-09	92.9	1.19	SC		A-C		
11-02	303.8	1.66			Σ 122						
13-89	303.9	1.75		1911-89	325.3	6.22	WB				
14-85	302.3	1.70		12-80	329.9	6.43					
11-87	304.9	1.60	WB								
11-92	302.7	1.73									
12-80	302.6	1.63									
12-82	303.3	1.71									
12-86	303.0	1.71									

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	A. 962				Σ 287				Σ 305		
1911-85	66.4	0.51	WB	1910-03	69.3	6.84	L	1910-09	315.3	2.96	WB
	β 8				β 1315			10-17	314.5	3.11	
1910-00	199.0	0.97	HF		A-B			11-92	315.2	2.94	
10-99	204.6	1.22		1910-83	125.5	1.54	WB	11-95	315.6	3.02	
11-94	201.9	1.09		10-93	127.7	1.23		12-99	313.0	2.79	
11-95	209.2	0.89		11-92	127.8	1.60		13-83	314.6	3.09	
14-01	207.5	0.94		11-95	130.6	1.55		13-84	314.3	3.08	
14-96	197.9	1.11		12-99	128.6	1.86		11-95	315.6	3.02	HF
	Σ 254			13-84	133.8	1.73		14-01	311.2	3.01	
1914-96	353.3	12.61	HF	14-01	137.8	1.75		14-96	315.7	3.29	
	Σ 257			10-03	129.5	1.58	L	14-99	314.9	3.32	HJ
1915-11	268.2	0.22	B	10-99	126.9	1.61	HF		β 262		
	Hu. 537			11-94	131.8	1.54		1911-08	64.5	1.51	WB
1914-09	23.8	2.04	SC	14-01	128.8	1.84		11-18	66.3	1.40	
	Ho. 216			14-96	129.4	1.71			Σ 311		
1911-95	339.6	1.09	HF		Σ 289			1910-09	116.7	3.12	WB
	Hu. 428			1910-19	1.0	29.07	L	10-93	117.3	3.11	
1911-95	59.6	0.69	HF	14-99	0.1	29.05	HJ	13-02	118.8	3.02	
	Hu. 603			10-97	359.3	28.91	WB	14-01	118.2	3.05	
1911-95	228.0	5.25	HF		$\Omega\Sigma$ 43			14-01	117.4	3.06	HF
14-96	224.2	5.46		1910-83	43.2	1.06	WB	14-96	116.8	3.09	
10-04	226.6	4.72	L	10-93	47.6	1.10			Ho. 218		
	Küstner 10			11-08	40.5	0.93		1910-07	96.6	0.19	B
1911-87	356.3	3.08	WB	11-18	39.8	1.05			Σ 314		
	$\Omega\Sigma$ 42			11-85	39.0	1.04		1913-17	304.2	1.78	SC
1910-07	135.7	0.16	B	13-02	43.9	1.16		14-09	303.7	1.51	WB
10-11	136.0	0.22		13-84	42.2	1.28			β 524		
11-09	137.1	0.28		10-91	41.4	1.11	L	1910-03	316.5	0.31	B
15-11	125.1	0.24		11-83	45.5	1.06	SC	10-07	312.3	0.27	
	Hn. 63			14-99	44.1	1.49	HJ	10-11	308.5	0.24	
1911-87	282.5	0.86	WB		Σ 295			11-09	316.7	0.17	
11-95	295.0	0.87		1914-99	316.5	4.66	HJ	14-06	304.8	0.31	
12-99	292.1	1.00			Σ 299			15-11	290.1	0.27	
11-83	291.7	1.02	SC	1910-99	288.4	2.83	HF		Σ 325		
14-96	286.7	0.99	HF	14-99	288.6	3.44	HJ	1914-09	182.4	10.30	WB
	Σ 285				Σ 300				Σ 326		
1911-83	170.1	1.90	SC	1910-09	306.1	2.96	WB	1914-10	216.2	7.75	WB
13-17	168.7	1.66		10-17	306.4	3.02			β 1173		
10-09	170.4	1.77	WB	13-02	306.9	3.03		1910-07	336.5	0.19	WB
10-11	170.7	1.55		14-01	305.4	2.64		10-09	341.9	0.13	
10-83	169.9	1.79		14-09	309.3	3.11		10-17	353.9	0.24	
11-87	168.8	1.62		10-84	308.8	3.13	SE	10-99	340.4	0.45	HF
14-01	166.7	1.78		10-85	307.1	3.18			β 525		
14-09	167.4	1.77		11-83	306.9	3.26	SC	1910-07	145.8	0.30	WB
14-09	171.2	1.63	HF	13-17	305.3	3.40		10-09	154.1	0.27	
	Hu. 1043				Hu. 1046			10-17	158.8	0.29	
1910-83	240.2	2.62	WB	1911-95	92.1	0.98	HF	10-17	153.9	0.28	
10-93	239.8	2.65			Σ 303			11-02	156.0	0.47	HF
11-92	238.7	2.81		1914-99	181.1	5.63	HJ		β 83		
11-95	242.9	2.63			β 83			1914-99	99.2	1.00	HJ
12-99	240.3	2.73			Σ 303						
13-83	241.6	2.88			β 83						
13-84	238.3	2.70			Σ 303						

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 333				Σ 355				Σ 381— <i>continued.</i>			
1910-91	198.2	1.46	L	1910-99	146.1	2.75	HF	1911-85	96.7	1.05	WB
10-06	200.6	1.30	WB	11-02	149.6	2.74		11-87	96.4	0.83	
10-09	201.3	1.31		14-01	141.6	2.39		11-92	97.0	1.01	
11-85	199.9	1.42		14-93	141.9	2.80		12-96	96.6	1.03	
11-87	202.4	1.29		14-96	147.7	2.38		12-99	98.7	1.09	
12-99	201.9	1.28		Σ 352				13-02	100.0	1.04	
13-02	202.8	1.48		1911-96	2.5	3.14	HF	13-14	103.9	0.98	
13-14	203.9	1.31		14-97	4.1	3.91		13-14	102.5	1.32	HF
14-10	207.3	1.42		β 1030				10-06	92.6	0.82	HF
14-99	198.8	1.67	HJ	1910-91	151.1	0.60	L	11-95	97.6	1.03	
10-99	200.1	1.55	HF	10-07	143.8	0.39	WB	15-00	100.7	1.10	
14-01	204.3	1.30		10-09	150.3	0.52		11-83	98.0	1.09	SC
14-93	197.8	1.64		10-17	151.5	0.43		<i>Hu.</i> 1058			
11-83	201.2	1.39	SC	13-84	137.8	0.45		1911-96	114.4	0.78	HF
11-89	203.1	1.28		11-95	160.6	0.62	HF	14-10	122.6	0.76	WB
13-17	206.5	2.07		<i>Ho.</i> 500				<i>A.</i> 983			
13-88	204.1	1.50		1911-96	38.6	0.71	HF	1911-96	306.7	0.54	HF
<i>Ho.</i> 318				<i>Glazenapp</i> I				<i>Hu.</i> 1061			
1911-94	208.7	3.13	HF	1910-99	265.8	4.57	HF	1910-03	52.3	3.27	L
14-93	201.5	3.61		11-02	268.8	4.11		Σ 412			
14-96	197.7	3.88		11-95	268.3	4.15		<i>A-B</i>			
14-99	204.1	3.86	HJ	15-00	267.2	4.52		1910-06	144.0	0.29	WB
Σ 334				11-83	268.0	4.40	SC	10-07	146.7	0.18	
1911-92	314.5	1.33	WB	Σ 360				10-09	148.0	0.20	
13-84	308.5	1.34		1910-84	133.7	2.23	SE	13-00	133.4	0.23	
13-99	317.2	1.33		10-85	135.3	2.17		13-14	156.8	..	
14-01	312.4	1.25	HF	11-12	135.4	1.96		13-14	145.6	0.22	
14-93	309.9	1.40		11-96	129.6	1.89	HF	13-84	124.9	0.15	
14-99	309.4	1.68	HJ	14-97	133.2	2.65		14-01	143.3	0.30	
$\Omega\Sigma$ 49				13-17	133.4	2.67	SC	14-06	124.1	0.28	
1910-83	62.5	1.66	WB	14-10	135.5	2.00	WB	14-16	119.3	0.16	
10-93	61.3	1.62		$\Omega\Sigma$ 51				14-06	127.1	0.15	B
11-83	61.0	2.17	SC	1911-96	305.4	1.31	HF	<i>A-C</i>			
10-91	60.9	1.77	L	13-17	312.9	1.56	SC	1913-00	58.6	22.47	WB
11-95	62.5	1.67	HF	14-09	314.6	1.25		14-07	59.6	22.32	
14-93	60.3	1.80		<i>Ho.</i> 502				Σ 413			
14-96	56.7	1.93		1911-96	20.7	0.77	HF	1910-84	129.3	2.65	SE
15-00	61.7	1.62		14-97	20.1	0.83		10-85	130.7	2.59	
<i>Hu.</i> 431				Σ 367				11-12	128.9	2.58	
1911-95	191.8	0.81	HF	1914-06	202.6	0.70	B	14-10	129.4	2.20	WB
Σ 346				10-99	200.1	0.82	HF	13-17	126.1	3.38	SC
<i>A-B</i>				$\Omega\Sigma$ 53				13-88	128.0	2.77	HF
1910-06	271.7	0.33	WB	1914-10	202.6	0.52	WB	14-96	125.3	2.59	
10-07	279.1	0.30		11-96	220.2	0.58	HF	β 533			
10-09	280.4	0.31		13-88	214.8	..	SC	1910-07	46.7	0.46	WB
11-92	270.0	0.34		Σ 380				10-09	44.6	0.54	
11-95	273.7	0.44		1914-96	53.4	1.13	HF	10-17	40.4	0.40	
10-19	269.1	0.38	L	Σ 381				10-17	43.6	0.58	
14-97	275.6	0.62	HF	1910-93	101.0	0.97	WB	12-96	42.0	0.72	
<i>A-C</i>				10-97	93.7	0.86		13-15	45.6	0.57	
1910-07	353.0	5.02	WB	Σ 381				13-84	45.0	0.59	
11-92	358.3	5.17		Σ 381				14-01	46.4	0.56	
11-95	358.1	5.12		Σ 381				14-10	46.6	0.75	
10-15	354.3	5.40	L	Σ 381				14-06	47.8	0.90	B
<i>B-C</i>				Σ 381				13-88	45.5	0.91	SC
1914-97	351.6	5.08	HF	Σ 381				11-96	46.9	0.76	HF
<i>A.G.</i> 61				Σ 381				14-97	48.7	0.69	
1911-83	34.2	1.05	SC	Σ 381							
13-88	25.8	0.93		Σ 381							
14-97	25.8	1.09	HF	Σ 381							

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Hn. 9				β 1184				Ho. 326		
1913-17	60°0	1 ^h 46	SC	1914-20	108°0	0 ^h 84	HF	1913-14	11°8	0 ^h 46	WB
14-09	60°5	1 ^h 77						14-97	346°1	0 ^h 61	HF
	Σ 425				Σ 453				Σ 499		
1910-09	89°2	2°40	WB	1913-00	159°2	0°32	WB	1910-93	283°9	1°36	WB
10-17	89°8	2°42		13-14	176°2	0°57		10-97	285°7	1°36	
11-88	91°7	2°24	HF	14-16	47°4	0°35		11-85	285°1	1°38	
13-17	92°9	2°85	SC		Hu. 1067			11-97	286°7	1°52	
	Hu. 1065			1910-84	72°6	1°28	SE	12-02	288°0	1°33	
1910-03	347°1	3°25	L	10-87	73°0	1°24		12-96	287°4	1°42	
	β 535			14-09	73°3	1°31	SC	13-15	288°9	1°98	
1914-96	43°9	0°72	HF		OΣ 64			13-84	286°5	1°90	
14-97	45°9	1°11		1910-91	230°3	3°52	L	11-93	291°3	2°12	SC
	Ho. 504				A-B				A-C		
1911-88	186°8	1°08	HF	1910-91	232°0	9°77	L	11-93	280°5	30°12	SC
14-97	192°4	1°05			A-C				β 546		
13-88	189°5	1°31	SC		OΣ 65			1913-19	31°8	1°01	SC
	Bar. 3			1910-06	202°7	0°42	WB	14-15	31°4	1°00	
1910-03	143°2	1°85	L	10-07	199°2	0°42			OΣ 74		
10-93	143°7	1°18	WB	10-09	201°7	0°52		1914-15	292°8	0°47	B
	β 880			12-96	201°9	0°49			OΣ 77		
1914-16	357°2	0°57	WB	12-99	203°8	0°40		1914-15	226°5	0°67	SC
14-15	6°0	0°62	B	13-00	205°0	0°45		14-06	227°3	0°40	B
	Hu. 103			13-14	203°4	0°42		14-15	218°2	0°38	
1914-09	206°1	1°09	SC	13-15	199°7	0°49		14-01	222°3	0°36	WB
	Σ 439			14-01	202°1	0°52		14-10	223°3	0°38	
1914-16	38°3	23°46	WB	14-10	196°2	0°64		14-16	221°7	0°24	
	Σ 442			14-16	205°0	0°50			A-C		
1910-93	268°8	2°15	WB	14-97	206°1	0°80	HF	1914-15	42°9	56°14	SC
10-95	268°8	2°01			Hu. 28				A-D		
10-97	268°3	2°17		1914-09	343°1	1°21	HF	1914-15	313°3	128°0	SC
13-02	271°4	2°33			Σ 479				Ho. 328		
13-84	267°7	2°59		1910-09	127°5	7°10	WB	1912-96	165°5	0°36	WB
15-00	245°9	1°68	HF	10-12	127°2	7°27		12-99	158°7	0°37	
11-83	259°4	2°68	SC		Σ 476			13-00	174°9	0°22	
10-03	268°4	2°74	L	1911-93	287°1	21°27	SC	13-84	182°7	0°24	
	β 536				Σ 481			13-95	165°5	0°36	
1914-15	272°6	0°23	B		A-B				Σ 520		
1914-15	8°7	18°06	B	1911-83	107°9	2°97	SC	1911-18	116°8	0°83	WB
	Hu. 1066				A-C			11-20	115°3	0°69	
1913-05	270°8	1°13	HF	1911-83	328°2	17°08	SC	12-96	117°7	0°95	
14-09	267°7	1°53			OΣ 531			12-99	116°7	0°66	
	Σ 450			1913-15	126°4	1°60	WB		OΣ 79		
1910-93	264°1	5°90	WB	14-10	122°9	1°41		1913-00	304°5	0°37	WB
10-97	264°6	5°84		14-06	121°2	1°56	B	13-84	309°3	0°36	
	OΣ 516			13-19	124°8	1°82	SC	14-07	305°4	0°25	B
1911-20	47°2	2°28	WB	14-15	119°6	1°56		14-15	302°9	(0°50)	
				11-12	127°2	1°73	SE		OΣ 80		
					Σ 3114			1910-11	182°6	0°45	B
				1910-84	172°1	2°28	SC	10-15	177°9	0°42	
				10-85	170°7	2°54		12-26	178°8	0°45	
					β 1232			12-27	189°3	0°39	
				1913-14	355°8	0°52	WB	15-21	180°8	0°60	
				14-97	346°1	0°61	HF	15-23	176°6	0°48	
								14-10	174°4	0°68	WB
								14-16	181°1	0°56	
								14-15	181°5	0°85	SC

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
OΣ 82				Σ 562				Σ 577			
1912-99	111.3	0.52	WB	1911-20	275.9	2.08	WB	1910-17	64.0	1.54	WB
13-00	85.8	0.60		11-22	280.5	1.51		10-17	64.6	1.53	
13-11	79.1	0.80		11-97	277.3	1.81		13-15	64.7	1.41	
13-15	95.8	0.77		12-13	279.5	1.94	HF	13-84	61.0	1.49	
14-15	77.7	0.60	B	β 550				14-10	64.7	1.39	
11-02	95.6	0.76	HF	A-B				14-16	65.4	1.41	
13-04	98.3	0.53		1910-03	109.0	32.29	L	10-84	64.8	1.62	SE
Σ 535				Hu. 1084				Ho. 332			
1912-01	323.0	1.43	WB	1913-19	42.5	0.96	SC	1911-18	125.1	1.07	WB
12-02	320.3	1.31		14-15	38.3	0.81		11-97	122.0	1.13	
13-84	315.1	1.66		OΣ 86				A. 1013			
13-95	321.4	1.41		1910-06	59.4	0.36	WB	1914-15	319.2	0.70	SC
12-09	322.4	1.59	HF	10-07	60.6	0.33		Ho. 333			
12-13	320.6	1.34		10-09	56.4	0.45		1910-17	158.0	2.49	WB
13-04	321.2	1.55		14-01	54.6	0.50	HF	10-17	154.5	2.71	
14-01	321.4	1.62		13-04	54.9	0.54	B	11-01	158.2	1.98	
OΣ 81				Σ 566				Σ 589			
1911-20	36.6	4.81	WB	1914-21	284.2	1.70	SC	1911-02	293.9	4.39	HF
11-22	39.1	4.38		Σ 567				β 883			
Hu. 304				Σ 567				A-B			
1915-21	49.3	0.24	B	1910-17	321.8	1.77	WB	1910-06	337.1	0.33	WB
15-23	48.0	0.32		10-17	321.5	2.16		12-99	14.2	0.37	
10-06	31.1	0.21	WB	10-17	323.2	2.04		13-00	33.8	0.32	
10-12	32.9	0.24		10-93	321.2	1.83		13-04	25.4	0.33	
13-00	47.1	0.36		11-01	323.9	1.68		13-11	27.4	0.32	
A. 834				Σ 567				β 1045			
1914-15	228.1	0.49	SC	1910-17	321.8	1.77	WB	1911-08	8.6	6.26	L
A-C				Hu. 305				Σ 620			
1914-15	83.1	25.94	SC	1910-17	282.0	2.06	WB	1911-01	233.2	3.44	WB
β 745				Σ 565				Σ 620			
1913-19	120.6	..	SC	1913-15	169.6	1.34	WB	11-20	234.2	3.97	WB
14-15	130.6	0.69		14-10	173.3	1.56		11-97	233.9	3.65	HF
Σ 546				Hu. 305				Σ 622			
1911-01	183.9	6.81	WB	1910-17	282.0	2.06	WB	1910-93	171.2	2.24	WB
11-18	185.6	6.74		10-17	280.3	2.11		10-95	167.6	2.04	
13-95	184.9	6.91		12-02	277.7	1.67		10-97	172.2	2.04	
12-09	183.4	6.90	HF	Σ 565				OΣ 92			
14-01	186.6	6.82		1913-15	169.6	1.34	WB	1910-17	254.1	3.05	WB
β 1186				Σ 565				Σ 622			
1913-04	174.5	0.65	HF	14-10	173.3	1.56		10-17	255.1	3.32	
10-17	172.6	0.81	WB	14-16	175.6	1.41		10-84	258.7	3.35	SE
Hu. 1080				Σ 572				Σ 622			
1910-06	261.1	0.40	WB	1910-19	207.2	3.53	L	1910-93	171.2	2.24	WB
10-16	252.9	0.34		10-09	200.3	3.59	WB	10-95	167.6	2.04	
10-17	268.2	0.45		10-11	198.4	3.85		10-97	172.2	2.04	
11-20	259.3	0.31		11-01	198.2	3.59		OΣ 92			
11-97	256.7	0.37		11-18	201.8	3.68		1910-17	254.1	3.05	WB
12-02	257.7	0.36		Hu. 441				Σ 622			
12-99	249.0	0.37		1913-04	46.3	1.80	HF	10-17	255.1	3.32	
13-00	253.8	0.43		Σ 572				Σ 622			
13-04	244.2	0.30		1910-19	207.2	3.53	L	10-84	258.7	3.35	SE
13-09	249.2	0.38		10-09	200.3	3.59	WB	10-85	261.7	3.38	
14-01	265.0	0.47		10-11	198.4	3.85		Σ 622			
14-07	247.8	0.16		11-01	198.2	3.59		1910-93	171.2	2.24	WB
Σ 546				Σ 572				Σ 622			
1911-01	183.9	6.81	WB	1910-19	207.2	3.53	L	10-95	167.6	2.04	
11-18	185.6	6.74		10-09	200.3	3.59	WB	10-97	172.2	2.04	
13-95	184.9	6.91		10-11	198.4	3.85		OΣ 92			
12-09	183.4	6.90	HF	11-01	198.2	3.59		1910-17	254.1	3.05	WB
14-01	186.6	6.82		11-18	201.8	3.68		10-17	255.1	3.32	
β 1186				Σ 572				Σ 622			
1913-04	174.5	0.65	HF	1910-19	207.2	3.53	L	10-84	258.7	3.35	SE
10-17	172.6	0.81	WB	10-09	200.3	3.59	WB	10-85	261.7	3.38	
Hu. 1080				Σ 572				Σ 622			
1910-06	261.1	0.40	WB	1910-19	207.2	3.53	L	1910-93	171.2	2.24	WB
10-16	252.9	0.34		10-09	200.3	3.59	WB	10-95	167.6	2.04	
10-17	268.2	0.45		10-11	198.4	3.85		10-97	172.2	2.04	
11-20	259.3	0.31		11-01	198.2	3.59		OΣ 92			
11-97	256.7	0.37		11-18	201.8	3.68		1910-17	254.1	3.05	WB
12-02	257.7	0.36		Hu. 441				Σ 622			
12-99	249.0	0.37		1913-04	46.3	1.80	HF	10-17	255.1	3.32	
13-00	253.8	0.43		Σ 572				Σ 622			
13-04	244.2	0.30		1910-19	207.2	3.53	L	10-84	258.7	3.35	SE
13-09	249.2	0.38		10-09	200.3	3.59	WB	10-85	261.7	3.38	
14-01	265.0	0.47		10-11	198.4	3.85		OΣ 92			
14-07	247.8	0.16		11-01	198.2	3.59		1910-17	254.1	3.05	WB
Σ 546				Σ 572				Σ 622			
1911-01	183.9	6.81	WB	1910-19	207.2	3.53	L	10-17	255.1	3.32	
11-18	185.6	6.74		10-09	200.3	3.59	WB	10-84	258.7	3.35	SE
13-95	184.9	6.91		10-11	198.4	3.85		10-85	261.7	3.38	
12-09	183.4	6.90	HF	11-01	198.2	3.59		OΣ 92			
14-01	186.6	6.82		11-18	201.8	3.68		1910-17	254.1	3.05	WB
β 1186				Σ 572				Σ 622			
1913-04	174.5	0.65	HF	1910-19	207.2	3.53	L	10-17	255.1	3.32	
10-17	172.6	0.81	WB	10-09	200.3	3.59	WB	10-84	258.7	3.35	SE
Hu. 1080				Σ 572				Σ 622			
1910-06	261.1	0.40	WB	1910-19	207.2	3.53	L	10-95	167.6	2.04	
10-16	252.9	0.34		10-09	200.3	3.59	WB	10-97	172.2	2.04	
10-17	268.2	0.45		10-11	198.4	3.85		OΣ 92			
11-20	259.3	0.31		11-01	198.2	3.59		1910-17	254.1	3.05	WB
11-97	256.7	0.37		11-18	201.8	3.68		10-17	255.1	3.32	
12-02	257.7	0.36		Hu. 441				Σ 622			
12-99	249.0	0.37		1913-04	46.3	1.80	HF	10-84	258.7	3.35	SE
13-00	253.8	0.43		Σ 572				Σ 622			
13-04	244.2	0.30		1910-19	207.2	3.53	L	10-85	261.7	3.38	
13-09	249.2	0.38		10-09	200.3	3.59	WB	OΣ 92			
14-01	265.0	0.47		10-11	198.4	3.85		1910-17	254.1	3.05	WB
14-07	247.8	0.16		11-01	198.2	3.59		10-17	255.1	3.32	
Σ 546				Σ 572				Σ 622			
1911-01	183.9	6.81	WB	1910-19	207.2	3.53	L	10-95	167.6	2.04	
11-18	185.6	6.74		10-09	200.3	3.59	WB	10-97	172.2	2.04	
13-95	184.9	6.91		10-11	198.4	3.85		OΣ 92			
12-09	183.4	6.90	HF	11-01	198.2	3.59		1910-17	254.1	3.05	WB
14-01	186.6	6.82		11-18	201.8	3.68		10-17	255.1	3.32	
β 1186				Σ 572				Σ 622			
1913-04	174.5	0.65	HF	1910-19	207.2	3.53	L	10-84	258.7	3.35	SE
10-17	172.6	0.81	WB	10-09	200.3	3.59	WB	10-85	261.7	3.38	
Hu. 1080				Σ 572				Σ 622			

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 734 A-B				Σ 753—continued. A-C				$O\Sigma$ 118			
1910-11	354.8	1.82	WB	1910-17	267.9	12.28	WB	1910-07	313.6	0.57	WB
10-12	356.7	1.48		10-20	268.2	12.53		10-09	317.6	0.60	
10-17	356.4	1.43		14-16	267.8	12.52		10-16	308.3	0.52	
10-93	353.9	1.57		14-23	268.3	12.24		12-19	322.3	0.50	
β 1049				Σ 757				Σ 795			
1910-17	299.3	0.57	WB	1914-20	235.6	1.53	HF	1910-08	205.7	1.15	WB
β 1267				$O\Sigma$ 112				Σ 791			
1910-20	217.8	0.76	L	1910-07	66.9	0.51	WB	10-11	204.6	1.30	
10-21	210.1	0.61	WB	10-17	65.8	0.53		11-01	207.4	1.20	
10-22	211.1	0.67		14-15	66.6	0.99	SC	11-15	207.5	1.21	
11-18	212.1	0.68		β 1032				12-01	206.9	1.38	
12-07	214.3	0.81		1910-16	326.1	0.20	B	12-99	210.0	1.44	
Hu. 1108				Hu. 825				Lewis			
1910-84	147.4	1.42	SE	1910-07	326.3	0.19	WB	1914-16	177.2	3.51	WB
Σ 750				Σ 774				Σ 799			
1913-19	60.8	4.82	SC	10-09	331.6	0.33		1913-15	89.9	4.85	WB
Σ 736				A-C				Σ 791			
1910-21	171.4	2.23	WB	1913-19	158.8	2.65	SC	13-18	90.8	4.96	SC
10-22	172.9	2.33		1913-19	9.8	57.84	SC	14-15	91.9	5.41	
13-15	168.2	2.32		β 1007				14-21	93.8	4.94	
14-10	170.2	2.10		1910-11	279.9	0.17	B	Σ 799			
13-19	171.8	2.66	SC	10-15	272.2	0.22		1914-15	174.6	1.05	SC
14-15	172.3	2.50		10-16	261.7	0.21		14-21	182.8	1.12	
14-21	173.6	2.51		12-13	260.9	0.19		10-21	178.7	0.92	WB
Σ 742				Σ 770				Σ 802			
1910-21	261.5	3.60	WB	1910-93	335.2	1.47	WB	1910-05	107.9	3.17	SE
10-22	260.1	3.47		10-97	333.1	1.03		10-21	105.5	2.83	WB
11-01	261.6	3.45		Hu. 38				10-22	105.7	2.85	
11-11	263.6	3.31		1910-09	134.7	0.37	WB	13-15	106.7	2.85	
12-08	262.2	3.40		10-17	142.4	0.48		14-10	107.3	2.60	
12-09	262.2	3.30		10-24	146.2	0.44		14-21	108.1	2.94	SC
11-12	262.0	3.44	SE	11-08	148.3	0.48	SE	Küstner 24			
12-13	264.4	3.35	HF	Ait. 1040				1914-21	268.4	1.79	SC
Σ 749				Σ 787				$O\Sigma$ 123			
1910-07	162.1	0.83	WB	1910-09	129.7	0.58	WB	1910-08	174.9	1.88	WB
10-09	166.9	0.84		10-17	133.9	0.77		10-11	177.7	1.91	
13-00	168.2	0.82		10-22	131.8	0.81		10-12	177.1	2.13	
13-04	168.6	0.81		Σ 786				11-01	179.7	2.20	
13-08	158.6	0.68		1910-05	337.2	6.98	SE	11-15	174.3	2.14	
14-06	340.6	0.91		Σ 816				12-08	174.7	1.92	
14-07	340.2	0.70		1910-15	287.9	4.09	L	12-19	180.3	1.77	
14-10	349.3	0.82		12-07	286.0	4.31	HF	12-99	179.0	2.06	
14-16	347.5	1.01		Σ 753 A-B= β 1240				12-07	181.7	1.97	HF
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	Σ 816			
10-07	321.3	0.17	WB	Σ 786				1910-15	287.9	4.09	L
10-09	310.0	0.22		1910-05	337.2	6.98	SE	12-07	286.0	4.31	HF
10-17	330.5	0.24		Σ 787				Σ 816			
10-20	321.4	0.20		1911-18	74.6	1.00	WB	1910-08	174.9	1.88	WB
14-06	305.8	0.16	B	11-22	72.9	0.82		10-11	177.7	1.91	
14-15	310.8	0.25		11-24	69.8	1.19		10-12	177.1	2.13	
15-21	291.4	0.24		12-09	71.8	0.78		11-01	179.7	2.20	
15-23	297.7	0.19		12-19	68.7	0.96		11-15	174.3	2.14	
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	1910-15	287.9	4.09	L
10-07	321.3	0.17	WB	Σ 787				12-07	286.0	4.31	HF
10-09	310.0	0.22		1911-18	74.6	1.00	WB	Σ 816			
10-17	330.5	0.24		11-22	72.9	0.82		1910-08	174.9	1.88	WB
10-20	321.4	0.20		11-24	69.8	1.19		10-11	177.7	1.91	
14-06	305.8	0.16	B	12-09	71.8	0.78		10-12	177.1	2.13	
14-15	310.8	0.25		12-19	68.7	0.96		11-01	179.7	2.20	
15-21	291.4	0.24		12-99	68.2	1.33		11-15	174.3	2.14	
15-23	297.7	0.19		10-05	75.5	1.17	SE	12-08	174.7	1.92	
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	12-19	180.3	1.77	
10-07	321.3	0.17	WB	Σ 787				12-99	179.0	2.06	
10-09	310.0	0.22		1911-18	74.6	1.00	WB	12-07	181.7	1.97	HF
10-17	330.5	0.24		11-22	72.9	0.82		Σ 816			
10-20	321.4	0.20		11-24	69.8	1.19		1910-15	287.9	4.09	L
14-06	305.8	0.16	B	12-09	71.8	0.78		12-07	286.0	4.31	HF
14-15	310.8	0.25		12-19	68.7	0.96		Σ 816			
15-21	291.4	0.24		12-99	68.2	1.33		1910-08	174.9	1.88	WB
15-23	297.7	0.19		10-05	75.5	1.17	SE	10-11	177.7	1.91	
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	10-12	177.1	2.13	
10-07	321.3	0.17	WB	Σ 787				11-01	179.7	2.20	
10-09	310.0	0.22		1911-18	74.6	1.00	WB	11-15	174.3	2.14	
10-17	330.5	0.24		11-22	72.9	0.82		12-08	174.7	1.92	
10-20	321.4	0.20		11-24	69.8	1.19		12-19	180.3	1.77	
14-06	305.8	0.16	B	12-09	71.8	0.78		12-99	179.0	2.06	
14-15	310.8	0.25		12-19	68.7	0.96		12-07	181.7	1.97	HF
15-21	291.4	0.24		12-99	68.2	1.33		Σ 816			
15-23	297.7	0.19		10-05	75.5	1.17	SE	1910-15	287.9	4.09	L
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	12-07	286.0	4.31	HF
10-07	321.3	0.17	WB	Σ 787				Σ 816			
10-09	310.0	0.22		1911-18	74.6	1.00	WB	1910-08	174.9	1.88	WB
10-17	330.5	0.24		11-22	72.9	0.82		10-11	177.7	1.91	
10-20	321.4	0.20		11-24	69.8	1.19		10-12	177.1	2.13	
14-06	305.8	0.16	B	12-09	71.8	0.78		11-01	179.7	2.20	
14-15	310.8	0.25		12-19	68.7	0.96		11-15	174.3	2.14	
15-21	291.4	0.24		12-99	68.2	1.33		12-08	174.7	1.92	
15-23	297.7	0.19		10-05	75.5	1.17	SE	12-19	180.3	1.77	
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	12-99	179.0	2.06	
10-07	321.3	0.17	WB	Σ 787				12-07	181.7	1.97	HF
10-09	310.0	0.22		1911-18	74.6	1.00	WB	Σ 816			
10-17	330.5	0.24		11-22	72.9	0.82		1910-08	174.9	1.88	WB
10-20	321.4	0.20		11-24	69.8	1.19		10-11	177.7	1.91	
14-06	305.8	0.16	B	12-09	71.8	0.78		10-12	177.1	2.13	
14-15	310.8	0.25		12-19	68.7	0.96		11-01	179.7	2.20	
15-21	291.4	0.24		12-99	68.2	1.33		11-15	174.3	2.14	
15-23	297.7	0.19		10-05	75.5	1.17	SE	12-08	174.7	1.92	
Σ 753 A-B= β 1240				Σ 786				Σ 816			
1910-20	316.1	0.16	L	1910-05	337.2	6.98	SE	12-19	180.3	1.77	
10-07	321.3	0.17	WB	Σ 787				12-99	179.0	2.06	</

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Ho. 337				β 1058— <i>continued.</i>				H. 385— <i>continued.</i>			
A-B				1913-14				A-D			
1910-11	111.8	9.26	WB	264.4	0.33	"	WB	1910-19	290.4	8.82	L
10-17	116.6	9.65		14.06	268.7	0.34		A-E			
11-23	116.5	9.31	HF	14.07	266.3	0.26		1910-19	58.0	16.42	L
B-C				14.23	285.1	0.16		Hu. 452			
1910-11	102.2	1.11	WB	10.11	277.3	0.30	B	1910-19	342.2	2.42	L
10-17	106.9	1.25		10.15	274.8	0.24		Σ 881			
11-23	104.2	1.35	HF	10.16	262.5	0.24		1914.21	111.9	1.07	SC
Σ 821				11.14	267.8	0.34		Hu. 702			
1910-21	5.9	2.07	WB	11.16	268.9	0.31		1910-21	325.3	0.93	WB
10-22	358.3	2.02		12.26	274.7	0.32		10-22	324.2	0.81	
10-24	6.6	1.86		12.32	268.9	0.34		10-19	322.0	0.94	L
11-11	5.5	2.12		14.15	273.8	0.32		12.25	323.2	0.89	SC
11-15	8.6	2.04		15-21	268.7	0.19		$\text{O}\Sigma$ 140			
11-23	4.6	2.12	HF	15-23	267.3	0.29		1911-08	118.9	2.71	WB
Σ 826				A. Clarke 3				11-15	121.6	2.62	
1912-01	122.1	1.75	WB	1914-99	175.3	1.40	HJ	12-02	114.0	2.80	
Barnard 4				AG 107				12-07	115.5	2.65	
A-B				1912-01	174.8	1.17	WB	12-08	122.2	2.26	
1910-11	189.9	1.89	WB	12-02	170.7	0.95		13-08	119.9	3.00	
10-14	193.9	1.86		11-08	179.7	1.40	SE	14-06	119.7	2.84	
12-01	187.8	1.59		Σ 875				10-05	118.4	3.35	SE
12-07	191.3	1.88		1914-99	326.9	5.17	HJ	10-15	119.9	3.03	HF
12-19	186.1	1.54		Lewis 7				11-23	120.5	2.51	
A-C				1910-19	86.1	3.07	L	12-07	115.7	2.70	
1910-11	13.0	4.08	WB	11-21	82.9	3.18		AG 112			
10-14	15.5	4.29		Σ 877				1912-01	210.7	2.93	WB
Σ 835				1911-08	261.9	5.57	WB	12-02	205.3	2.58	
1910-95	144.1	1.93	WB	11-09	264.1	5.51		12-07	205.6	2.98	
$\text{O}\Sigma$ 131				12-08	263.9	5.40		10-15	207.9	3.26	HF
1910-17	283.3	1.25	WB	12-19	261.4	5.49		11-26	208.3	2.79	
10-17	287.6	1.45		β 895				12-25	210.7	3.39	SC
11-24	285.2	1.44		A-B				Σ 905			
11-27	278.2	1.38	HF	1910-20	165.2	0.19	WB	1912-25	127.7	2.48	SC
11-23	277.1	1.38		10-23	176.8	0.16		Σ 912			
$\text{O}\Sigma$ 132				10-24	166.1	0.13		1910-17	24.7	3.32	WB
1910-17	315.8	1.48	WB	13-00	190.1	0.28		10-17	26.0	3.41	
10-17	311.7	1.85		14-06	189.3	0.28		10-19	25.5	3.46	L
10-21	320.4	1.60		Σ 888				Σ 919			
10-22	319.2	1.79		A-C				A-B			
13-15	315.2	1.60	HF	1910-17	253.2	2.98	WB	1911-08	133.4	7.37	WB
11-26	322.8	1.88		10-17	253.6	3.12		11-15	132.1	7.02	
Σ 851				11-08	256.2	2.74		B-C			
1910-05	30.2	2.59	SE	11-11	254.4	2.89		1911-08	106.5	2.45	WB
10-15	28.2	2.61	HF	11-24	253.9	2.73		11-15	105.6	2.49	
12-07	29.1	2.71		12-08	258.9	2.54		β 1021			
Σ 849				12-09	253.7	2.71		1910-10	86.6	0.65	WB
1910-09	242.6	0.76	WB	13-00	255.1	2.62		10-17	91.3	0.59	
10-13	245.0	0.85		13-09	255.0	2.81		10-17	88.7	0.68	
10-13	253.5	0.78		13-14	255.8	2.82		13-00	85.6	0.78	
10-14	242.0	0.85		14-06	256.0	2.84		Σ 918			
β 1058				14-16	250.6	2.78		1914-21	331.3	4.60	SC
1912-07	256.7	0.31	WB	14-23	250.6	2.65		14-28	328.8	4.67	
12-19	270.3	0.28		H. 385				$\text{O}\Sigma$ 145			
13-00	256.8	0.26		A-B				1910-10	338.1	1.54	WB
13-04	262.2	0.28		1910-15	48.2	1.58	HF	10-11	338.2	1.48	
				10-19	48.4	1.63	L				
				A-C							
				1910-19	52.5	6.38	L				

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	β 327				Σ 1037— <i>continued.</i>				Küstner 29		
1911·14	91·7	0·66	B		A-B			1910·29	143·0	3·26	WB
11·16	91·7	0·45		1911·18	297·6	0·42			Hu. 706		
	β 899			12·19	288·5	0·54		1912·20	230·3	0·59	WB
	A-B			12·20	288·7	0·39			A. G. 140		
1911·26	269·5	0·82	HF	12·31	289·1	0·53		1912·18	170·9	1·92	WB
	A-C			13·04	286·1	0·37		12·31	172·2	2·00	
1911·26	173·8	24·32	HF	13·08	295·4	0·56			Σ 1089		
	A-D			13·14	285·7	0·53		1910·25	8·2	7·07	WB
1911·26	47·5	40·68	HF	13·18	283·8	0·40			A. G. 141		
	β 1022			14·06	283·3	0·44		1910·22	33·0	42·3	WB
1910·15	310·8	0·36	B	14·16	282·3	0·37		10·23	32·6	4·23	
11·14	303·0	0·52		14·23	295·8	0·57			β 21		
11·16	293·3	0·31		14·28	286·4	0·43		1910·25	26·3	4·28	HF
12·31	299·7	0·31			A-C			15·23	24·6	3·87	
	Ho. 342			11·08	106·3	16·05	WB		Σ 1093		
1910·11	81·6	1·04	WB	11·15	105·6	15·63		1912·25	146·1	0·90	SC
10·12	78·0	0·94		11·17	109·3	16·00			Σ 1092		
10·14	80·5	1·19		13·18	108·3	15·22		1912·25	72·8	3·07	SC
12·07	82·6	0·93			O Σ 520			14·21	74·3	2·92	
12·19	83·0	1·03		1910·26	359·2	0·60	WB		Σ 1104		
13·06	81·6	1·09		13·04	6·9	0·48		1913·23	338·9	2·57	B
	Σ 1009				β 1023				Σ 1110		
1912·27	153·9	3·77	SC	1910·26	299·4	0·28	WB	1910·20	220·6	5·67	L
13·19	150·7	4·11			O Σ 170			11·25	221·4	5·66	
14·21	155·0	3·78		1910·25	108·2	1·39	WB	15·11	220·8	5·11	HJ
14·29	152·5	3·87		10·26	106·9	1·59		10·13	220·5	5·41	WB
	Σ 1014			11·08	107·4	1·49		10·20	219·6	5·73	
1910·12	39·3	1·68	WB	11·15	108·0	1·53		11·18	220·6	5·41	
10·14	37·2	1·81		12·08	106·2	1·52		11·24	221·2	5·46	
	Hu. 454			12·18	105·6	1·63		13·18	220·7	5·52	
	A-B			12·18	105·6	1·63		14·16	220·7	5·52	
1911·26	217·7	2·01	HF	14·06	106·1	1·75		14·16	216·6	5·32	
10·14	212·1	2·04	WB	14·09	104·7	1·58			A-C		
10·26	210·5	1·86			Σ 1068			1915·11	163·0	73·18	HJ
12·07	212·5	1·94		1910·25	346·2	3·75	WB		Σ 1114		
	A-C			11·08	357·5	3·92		1910·25	56·3	6·72	HF
1911·26	45·7	13·12	HF	11·15	347·3	3·64			Hu. 707		
	A. G. 135			12·18	348·3	3·96		1915·23	21·2	2·45	HF
1910·22	28·7	3·73	WB	12·20	347·9	3·48			O Σ 175		
10·23	26·3	3·66		14·06	347·4	3·77		1910·20	328·9	0·78	L
	Hu. 836			14·14	349·3	4·17		10·11	329·6	0·56	B
1912·25	305·9	1·33	SC	15·23	352·6	4·08	HF	10·15	324·9	0·66	
	O Σ 165				Σ 1066			10·16	325·3	0·67	
1911·26	34·5	5·16	HF	1910·25	208·5	6·72	HF	10·05	332·2	1·02	SE
	Hu. 618			11·25	212·1	6·45			Maedler 2		
1912·25	121·8	1·59	SC	15·32	209·2	6·81		1912·25	120·8	3·13	SC
	Σ 1037				Σ 1074				O Σ 174		
	A-B			1914·22	138·7	0·37	WB	1912·25	83·9	2·12	SC
1915·21	277·6	0·44	B		Σ 1081			13·19	87·0	2·18	
15·23	278·2	0·42		1913·10	229·1	1·44	SC	14·29	85·9	2·28	
10·17	298·0	0·72	WB	10·12	225·8	1·66	WB		Küstner 30		
10·20	298·5	0·44		10·14	228·5	1·60		1912·25	112·1	3·29	SC
10·23	293·9	0·46		11·11	228·5	1·36					
11·08	287·4	0·39		11·15	226·4	1·53					
11·15	293·0	0·67		11·24	230·9	1·51					
11·17	297·5	0·40		12·18	228·4	1·49					
				12·19	227·9	1·35					
				13·06	226·7	1·34					
				13·08	230·4	1·42					
				14·14	227·2	1·59					
				14·22	226·2	1·66					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Σ 1188				Σ 1196— <i>continued.</i>				Σ 1211		
1915-11	201.8	16.17	HJ		A-C			1910-20	123.9	1.08	WB
	A. G. 149			1912-18	108.5	4.90	WB	10-23	123.3	0.74	
1910-25	236.8	5.72	WB	12-29	109.1	5.23		10-24	127.7	0.77	
	Σ 1187			13-09	112.7	4.57		11-27	127.0	0.86	
1913-19	40.9	2.57	SC	13-31	113.9	4.95		11-34	121.9	0.92	
14-13	40.1	2.41		14-14	113.7	4.86		12-29	126.0	0.86	
14-29	40.8	2.52		14-21	110.3	4.91		12-32	122.6	0.70	
15-11	36.8	2.38	HJ	14-25	114.3	5.17					
10-13	42.4	2.15	WB	13-20	110.1	4.90	HF		Σ 1212		
10-13	41.3	2.35			$\frac{AB}{2}$ -C			1910-13	236.3	5.17	WB
14-23	40.8	2.36		1915-22	113.9	4.62	HJ	10-13	237.3	5.29	
14-28	38.6	2.40			B-C			11-27	236.4	5.41	
13-20	41.1	2.20	HF	1913-20	115.3	6.19	HF	11-27	235.8	5.28	
	Hu. 849			15-22	116.3	5.48	HJ		Σ 1205		
1910-26	286.7	1.06	WB	14-13	115.8	6.05	SC	1912-25	178.5	1.33	SC
	Hu. 850			14-29	116.9	5.93		14-29	175.3	1.30	
1910-26	353.5	0.62	WB	10-11	116.7	6.15	WB	11-35	171.4	0.85	WB
11-35	353.8	0.54		10-24	118.0	5.95			β 1320		
11-35	350.7	0.63		11-17	118.4	6.01		1910-12	359.9	4.48	WB
12-29	358.0	0.68		11-24	117.7	5.86		12-24	4.6	5.01	HF
12-31	359.7	0.84		11-34	118.3	5.78			Σ 1216		
12-32	351.4	0.69		12-18	117.8	6.00		1912-32	211.0	0.38	B
	Σ 1194			12-29	117.5	5.90		15-23	214.7	0.38	
1910-25	316.6	3.36	WB	13-09	117.1	5.91		15-33	218.8	0.31	
11-17	317.0	2.85		13-31	119.1	5.61			Σ 1218		
	A. G. 150			14-25	116.8	5.85		1911-18	267.4	3.81	WB
1910-25	207.8	4.96	WB		Σ 1197			11-20	270.6	3.94	
	Espin 71			1911-18	101.1	1.68	WB		Σ 1218		
1914-29	282.1	3.22	SC	11-20	104.4	1.54		1911-18	267.4	3.81	WB
	Σ 1196			12-29	100.4	1.74		11-20	270.6	3.94	
	A-B			12-31	104.0	1.88			Hu. 855		
1911-33	327.3	0.92	L		Σ 1202			1910-24	219.2	0.78	WB
10-11	324.7	0.75	WB	1915-22	316.4	2.72	HJ	11-26	227.3	0.95	HF
10-24	326.8	0.97		10-12	316.9	2.28	WB		Hu. 856		
11-17	328.6	0.98		10-13	320.1	2.36		1910-26	272.8	0.32	WB
11-24	325.5	0.97		12-18	317.4	2.35		11-35	241.2	0.18	
11-34	321.0	1.05		12-20	317.1	2.24		12-29	262.0	0.19	
12-18	318.2	0.89		13-10	311.7	2.41		12-32	271.6	0.36	
12-29	320.1	1.16		14-22	317.1	2.34			Σ 1224		
13-09	314.4	0.97		14-29	319.6	2.60		1910-20	43.9	5.98	WB
13-31	316.3	1.03			β 204			10-22	42.9	6.07	
14-14	308.0	0.91		1910-14	297.9	0.97	WB	11-24	43.3	5.84	
14-20	310.4	0.96		10-26	300.6	0.66		11-27	44.9	5.91	
14-25	308.2	0.88		12-24	298.4	0.87	HF	13-10	45.0	5.69	
14-13	313.8	1.15	SC		β 1244			13-21	43.0	5.61	
14-28	311.7	1.00		1913-00	41.8	0.71	WB	14-14	47.7	5.81	
15-11	311.6	1.30	HJ	14-22	30.2	0.69		11-31	43.9	5.72	L
15-22	306.1	1.14		10-25	38.0	0.74	HF		Σ 1223		
13-20	315.1	0.92	HF	12-24	37.3	0.84		1911-31	215.6	5.13	L
	A-C				Σ 1200			11-26	216.8	5.20	HF
1914-13	115.7	4.88	SC	1911-35	359.9	8.07	WB	10-20	216.6	4.76	WB
14-29	113.0	5.07			Hu. 1123			10-21	216.6	4.94	
15-11	127.0	4.85	HJ	1910-26	157.4	0.36	WB	10-22	215.3	5.24	
10-11	109.4	5.29	WB		Hu. 625			11-24	215.1	4.81	
10-24	111.8	5.11		1910-13	355.8	1.64	WB	11-27	215.2	4.91	
11-17	112.0	4.89		10-24	349.8	1.72		12-27	217.3	4.90	
11-24	109.4	4.96		11-27	353.0	1.54					
11-34	113.3	4.95		11-34	347.3	1.47					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ I223— <i>continued.</i>				β 585				Σ I274			
1912.32	216.4	4.81		1913.04	97.9	0.36	WB	1911.27	42.7	9.25	WB
13.10	213.3	4.97		14.22	103.4	0.49		11.34	42.3	9.18	
13.21	216.1	4.73		14.25	104.6	0.49		β 335			
14.14	215.3	4.88		12.24	108.4	0.68	HF	1910.25	272.8	2.57	HF
11.08	218.4	4.94	SE	β 209				Σ I271			
Σ I228				1910.22	357.4	1.31	WB	1914.29	68.2	1.54	SC
1911.18	351.1	9.38	WB	10.24	357.6	1.45		14.09	64.1	1.12	HF
11.20	349.3	8.94		Σ I262				Σ I279			
11.24	349.5	8.61		1911.18	197.2	7.07	WB	1910.22	270.6	1.22	WB
A. 550				11.18	202.5	7.12		10.24	269.7	1.31	
1915.23	183.3	0.21	B	Σ I265				11.27	269.5	1.51	
15.33	180.9	0.24		1910.12	309.9	5.94	WB	11.34	272.3	1.39	
Σ I225				10.13	310.7	5.72		12.29	268.2	1.48	
1911.35	192.0	3.47	WB	11.16	309.3	5.89		12.32	268.2	1.45	
A. 551				11.18	309.2	5.62		Σ I278			
1915.23	65.0	0.31	B	12.24	310.3	5.59		1911.35	124.4	8.35	WB
15.33	52.8	0.34		14.29	309.5	5.80		11.35	123.9	8.37	
Σ I239				14.30	312.2	5.73		Σ I275			
1911.27	289.7	12.70	WB	Σ I263				1911.35	196.3	1.43	WB
11.34	290.2	12.71		1913.34	20.6	64.20	WB	Bowyer 2			
Σ I235				Krueger 30				1910.11	44.6	2.87	WB
1911.35	84.7	1.25	WB	1912.25	116.9	2.19	SC	10.13	44.9	2.89	
Σ I242				Σ I259				A. G. 157			
1911.27	171.9	2.59	WB	1911.27	341.1	4.87	WB	1910.11	73.7	1.93	WB
11.34	168.1	2.32		11.34	341.6	4.83		10.12	74.7	1.95	
A. G. 153				Σ I273				12.18	77.9	1.75	
1910.22	95.2	2.85	WB	A-B				12.27	75.0	1.73	
10.23	90.8	2.50		1910.16	204.3	0.23	B	11.08	77.0	2.05	SE
10.24	93.0	2.65		10.32	194.7	0.19		Ho. 40			
14.28	92.6	2.82		12.32	227.0	0.24		1910.26	288.0	0.55	WB
14.29	89.1	2.70		15.23	279.8	0.17		Σ I287			
12.25	88.2	3.50	SC	15.33	279.7	0.21		1910.11	93.6	1.83	WB
14.29	90.8	3.06		11.34	212.2	0.27	WB	10.13	91.5	1.74	
A. G. 154				11.35	210.3	0.25		12.18	94.0	1.77	
1910.11	5.8	1.58	WB	12.32	219.3	0.30		12.30	91.7	1.92	
10.12	5.0	1.59		12.33	220.6	0.25		14.23	91.5	2.12	
11.16	3.7	1.65		13.00	242.0	0.32		14.29	94.2	1.99	
11.18	359.7	1.58		14.22	255.2	0.28		β 587			
12.18	2.3	1.44		14.25	252.9	0.24		1913.23	148.7	0.78	B
12.29	2.3	1.58		14.30	243.6	0.24		Σ I290			
Σ I244				A-C				1911.18	311.4	3.14	WB
1911.27	1.5	3.38	WB	14.13	242.5	3.44	SC	Σ I288			
11.34	0.4	3.39		13.00	241.4	3.21	WB	1911.18	256.4	7.22	WB
12.25	0.0	3.76	SC	14.22	242.7	3.20		11.20	262.2	7.28	
Σ I251				14.25	243.2	3.31		11.27	258.3	7.66	
1911.34	26.5	6.05	WB	14.30	244.7	3.75		11.35	256.9	7.63	
11.35	28.9	6.02		$\frac{AB}{2}$ -C				Σ I291			
Hu. 858				1910.16	239.1	3.36	WB	1910.13	320.5	1.28	WB
1912.24	158.3	0.81	HF	11.34	238.5	3.48		10.13	323.8	1.42	
Küstner 32				11.35	239.2	3.49		10.14	323.6	1.24	
1910.11	169.4	1.94	WB	12.30	240.4	3.30		12.33	320.8	1.47	
10.12	170.7	2.07		12.32	240.0	3.61		13.34	321.5	1.69	
11.16	164.3	1.98		15.23	244.4	3.17	B	13.36	321.7	1.48	
11.18	164.0	1.79		15.33	247.2	3.39		Hu. 458			
15.23	166.7	2.45	HF	Σ I291				1915.23	195.0	1.80	HF

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ I356				Σ I392				Σ I420			
1910-24	122.1	1.03	WB	1913-31	175.7	9.62	WB	1910-26	323.6	2.04	WB
11-16	123.5	0.99		14-29	174.5	9.20		11-27	322.4	2.07	
11-18	120.0	1.01						11-34	324.8	2.17	
12-24	119.8	0.99		Σ I397				Σ I423			
12-27	122.2	1.02		1910-24	112.8	0.89	WB	1910-14	54.9	1.41	WB
14-21	125.2	0.93		12-27	107.7	1.30		10-16	58.4	1.28	
14-22	125.5	0.99		13-10	103.5	1.08		10-24	55.3	1.47	
15-22	125.5	1.04	HJ	14-30	109.5	1.16		12-18	53.2	1.54	
12-28	120.8	0.95	HF	14-33	109.2	0.99		12-27	53.5	1.45	
15-24	125.0	0.94		Σ 210				13-31	54.4	1.63	
15-31	123.6	0.92		1913-34	260.5	1.03	WB	14-21	56.6	1.06	
19-27	126.7	0.98		13-36	261.3	1.13		14-22	56.3	1.31	
14-13	129.3	1.21	SC	Σ I394				14-23	54.9	1.56	
19-27	128.1	1.17	JJ	1913-37	242.1	4.31	WB	14-28	58.2	1.44	
Σ I372				Σ I394				15-31	52.3	1.51	HF
1910-16	60.4	0.59	WB	Weisse 23				19-38	50.1	1.39	
10-24	61.1	0.45		1910-25	310.7	3.61	HF	Σ I424			
12-30	58.1	0.47		Σ I413				1910-24	67.5	0.74	WB
12-31	55.2	0.68		1910-24	276.8	2.02	WB	10-26	73.1	0.86	
11-08	62.3	0.58	SE	10-25	277.3	2.02		11-27	73.9	0.86	
Σ I375				Σ I413				11-39	74.7	0.88	
1911-35	303.9	7.30	WB	12-18	276.8	1.89		12-41	66.0	0.83	
Σ I377				12-18	274.6	2.02		Σ I424			
1910-25	143.8	3.76	HF	12-27	275.6	1.95		1912-26	113.2	3.70	WB
Σ I384				13-10	278.4	1.92		12-29	114.9	3.71	
1910-25	183.1	12.09	HF	13-31	274.4	2.00		11-29	113.3	3.59	HF
Ho. 369				Σ 213				19-32	119.4	3.41	
1910-24	117.9	0.27	B	1914-21	101.7	0.71	WB	19-34	116.4	3.81	
12-32	123.3	0.16		14-22	90.9	0.98		19-36	117.6	3.53	
12-30	109.2	0.25	WB	14-29	92.5	1.00		19-36	117.4	3.62	
14-30	122.2	0.17		Lewis 10				19-36	118.5	3.78	JJ
14-33	101.9	0.29		1913-31	3.8	1.48	WB	19-36	117.1	4.00	
Σ 208				14-29	357.3	1.29		Σ I426			
1910-24	307.3	0.32	B	15-31	8.4	1.53	HF	A-B			
10-32	308.1	0.40		11-31	7.0	1.85	L	1912-18	290.0	0.62	WB
12-32	311.0	0.39		Σ I417				14-21	284.8	0.92	
13-34	310.2	0.22	WB	1911-29	259.7	2.20	HF	14-25	285.5	0.78	
13-36	311.1	0.31		Hu. 634				14-29	285.9	0.80	
A. 344				1910-24	165.1	1.67	WB	14-31	285.6	0.84	HF
1910-24	33.4	0.48	WB	10-26	165.9	1.83		15-24	285.2	0.82	
10-25	30.6	0.40		Σ 215				15-31	285.6	0.80	
12-31	33.7	0.53		1911-31	208.9	1.09	L	A-C			
13-36	29.4	0.53		11-08	205.0	0.97	SE	1914-21	7.7	7.79	WB
14-30	35.9	0.60		11-26	200.5	0.90	HF	14-25	6.6	7.67	
14-33	38.2	0.67		19-27	197.8	1.19		14-29	8.9	7.84	
A. C. 5				11-20	203.6	0.76	WB	15-24	5.3	7.60	HF
1910-16	70.6	0.51	B	11-35	201.9	0.79		Σ I425			
10-24	72.7	0.51		12-27	203.0	1.01		1913-37	355.9	4.54	WB
10-32	73.7	0.48		12-30	203.1	0.97		Σ 216			
12-26	63.7	0.50		19-27	196.9	..	JJ	1915-31	95.1	1.09	HF
12-32	72.2	0.39		Σ I419				Σ I429			
15-23	65.6	0.50		1910-24	225.5	4.18	WB	1912-27	246.2	0.54	WB
15-33	67.1	0.51		10-35	223.1	4.40		12-30	246.4	0.71	
14-25	70.5	0.37	WB	Σ I431				1911-17	68.5	3.08	WB

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
<i>OΣ 237—continued.</i>				<i>Ho. 535</i>				<i>Hu. 570</i>			
1912.41	266.2	1.35		1914.38	137.6	2.01	WB	1910.35	105.4	2.72	L
13.36	266.4	1.18		15.31	141.7	2.30	HF	11.39	111.3	2.59	
14.37	261.6	1.44		10.35	143.6	2.57	L	<i>Σ I619</i>			
19.45	257.5	1.12	HF	<i>Σ I589</i>				1912.31	277.9	7.39	WB
19.46	254.9	1.11		1919.45	160.5	2.41	HF	<i>Σ I620</i>			
<i>Ait. 678</i>				19.46	159.0	2.17		1911.36	80.1	1.97	HF
1911.34	159.8	1.02	WB	<i>Σ I593</i>				<i>Σ I621</i>			
11.42	156.2	1.04		1915.28	194.0	1.52	HJ	1914.25	138.0	1.89	WB
14.38	154.8	1.39		<i>A. 681</i>				14.29	139.3	1.74	
14.32	149.3	1.48	HF	1911.42	134.4	0.39	WB	14.31	146.0	2.12	HF
10.35	163.7	1.36	L	11.43	129.1	0.39		14.32	142.2	2.11	
<i>Σ I566</i>				12.27	116.8	0.40		14.39	140.6	1.93	
1913.21	351.4	2.30	WB	12.31	128.3	0.56		<i>A. G. 176</i>			
14.24	350.3	2.82		10.35	130.3	0.58	L	1910.16	178.2	2.64	WB
14.26	349.9	2.80		<i>A. 682</i>				10.36	177.4	2.56	
<i>Hu. 888</i>				1910.35	332.8	0.58	L	10.40	178.6	2.83	
1913.21	139.1	0.75	WB	11.43	335.5	0.33	WB	<i>Hu. 1138</i>			
14.21	138.1	0.60		12.31	331.9	0.39		1914.29	1.6	1.06	WB
14.22	143.2	0.62		<i>Σ I601</i>				14.30	(344.8)	0.96	
14.25	141.4	0.54		1911.35	313.8	2.28	WB	14.33	356.3	1.12	
13.39	152.9	0.72	HF	11.39	313.7	2.03		14.40	357.0	1.06	
14.32	153.9	0.72		12.41	311.9	2.21		<i>Σ I634</i>			
14.39	150.2	0.73		13.36	310.9	2.06		1912.41	148.2	5.22	HF
15.28	146.1	0.84	HJ	13.37	307.6	2.21		10.16	147.5	5.09	WB
15.34	150.2	0.92		14.24	313.9	2.32		10.32	148.4	5.08	
<i>β 793</i>				14.37	309.5	1.83		13.21	147.6	5.42	
1914.32	114.0	1.34	HF	19.44	308.7	2.00	HF	13.29	147.5	5.29	
<i>β 603</i>				19.46	312.7	2.21		13.31	145.0	5.25	
1914.26	293.5	0.88	WB	<i>Σ 3078</i>				1911.36	43.8	2.50	HF
14.39	303.1	0.66	HF	1911.36	304.9	9.58	HF	19.40	49.0	2.58	
13.23	297.7	0.77	B	<i>Σ I606</i>				19.41	45.4	2.78	
<i>Küstner 40</i>				1914.13	322.6	1.18	SC	19.44	44.4	2.57	
1914.33	182.9	2.38	WB	14.45	328.8	1.02		<i>Σ I639</i>			
14.37	183.1	2.72		11.35	328.4	1.13	WB	1910.35	339.9	0.57	L
14.38	179.2	2.44		11.39	327.7	1.00		11.36	343.6	0.47	
<i>Σ 3075</i>				11.40	326.1	0.88		13.39	349.1	0.66	HF
1914.39	3.9	5.93	HF	11.41	327.4	0.84		14.39	348.2	0.58	
<i>Küstner 41</i>				11.42	325.1	0.86		19.40	342.3	0.72	
1914.29	69.3	5.03	WB	12.39	325.3	0.97		19.44	337.5	0.66	
14.30	67.5	5.03		12.41	329.1	0.97		15.24	350.7	0.36	HJ
14.3b	69.3	4.76		13.21	329.8	1.33		15.34	350.2	0.64	
14.32	67.0	5.21	HF	14.24	326.3	0.81		12.31	344.2	0.76	SC
<i>OΣ 241</i>				19.44	326.2	0.84	HF	12.33	346.3	0.71	
1911.35	129.7	1.52	WB	19.46	326.8	0.82		10.45	341.5	0.42	WB
11.39	129.6	1.31		<i>Σ I613</i>				11.34	341.4	0.38	
11.40	129.1	1.34		1911.42	11.1	1.23	WB	11.39	347.2	0.42	
12.39	128.3	1.63		11.43	10.4	1.37		11.40	343.2	0.37	
12.41	128.5	1.25		12.39	12.0	1.34		12.31	341.6	0.40	
<i>Σ I586</i>				12.41	8.0	1.31		12.31	338.7	0.60	
1919.44	246.9	1.39	HF	13.21	14.4	1.30		13.21	342.3	0.63	
19.46	249.3	1.62		13.41	6.4	1.25		13.29	341.3	0.43	
				14.24	10.5	1.31		13.41	339.5	0.36	
				14.37	4.1	1.15		14.24	340.9	0.49	
				14.13	21.8	1.45	SC	14.25	344.7	0.39	
				14.45	13.9	1.35		14.26	348.1	0.49	
								14.29	335.4	0.50	
								14.30	339.4	0.61	
								12.43	350.9	0.60	B

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	A.G. 177				Σ 1658				Hu. 640		
1914.32	218.4	7.83	HF		A-B			1913.48	127.1	0.32	B
	Σ 1642			1914.32	2.3	2.84	HF		Hu. 894		
1911.52	181.1	2.86	L	14.25	1.8	2.58	WB	1912.44	144.5	0.84	HF
14.13	183.6	2.93	SC	14.30	1.6	2.66			Σ 1687		
14.45	181.8	2.70		14.33	3.2	2.61			A-B.		
	β 922			19.38	2.0	2.75	JJ	1911.39	95.9	1.30	L
1914.32	156.8	0.81	HF		Σ 1661			14.45	90.2	1.08	SC
	Hn. 13			1912.44	241.5	2.43	HF	15.32	97.2	..	HJ
1914.32	155.5	1.04	HF	19.36	240.7	2.24		10.45	88.7	1.03	WB
	Σ 1643			19.36	239.8	2.29	JJ	11.30	88.5	1.00	
1911.39	35.4	2.36	L	19.38	240.9	2.50		11.42	96.0	1.15	
10.32	35.3	1.86	WB		Σ 1663			11.43	90.2	1.14	
10.35	35.7	2.11		1910.34	101.0	0.42	WB	13.29	88.7	1.04	
10.36	35.1	1.85		10.35	94.8	0.39		14.24	92.8	1.09	
11.40	33.6	1.83		10.35	95.0	0.51		14.26	93.9	1.27	
11.41	34.2	2.05		10.36	103.0	0.42		12.44	82.1	1.09	HF
12.31	34.2	2.07		10.45	108.4	0.72		13.39	96.6	1.03	
12.41	33.8	1.98		12.31	98.7	0.67		14.31	86.8	1.27	
13.21	34.1	2.07		12.41	96.4	0.68		14.39	93.9	1.32	
13.31	34.9	2.10		13.41	102.2	0.60		19.36	100.6	1.11	
14.24	34.6	2.20		12.41	97.2	0.96	HF	19.37	100.2	0.96	
14.29	34.7	2.18		12.44	98.4	0.72		19.41	100.5	0.87	
12.41	37.4	2.00	HF	13.39	100.9	0.75		19.44	98.5	1.01	
13.39	33.6	2.12		19.36	98.6	0.78		19.36	99.7	1.18	JJ
14.31	30.5	2.23		19.36	95.6	..	JJ	19.38	98.1	1.40	
14.39	35.5	2.54		19.38	98.1	..			$\frac{A B}{2} - C$		
19.36	26.4	2.06			Σ 1668			1914.45	126.6	28.69	SC
19.36	28.1	2.10	JJ	1912.31	193.5	1.76	WB	15.32	123.2	28.71	HJ
	β 1324			12.37	192.7	1.51			$\text{O}\Sigma$ 256		
1911.41	218.0	2.75	WB		Σ 1670			1912.43	74.3	0.72	B
11.42	218.6	2.34		1912.33	327.2	5.91	SC	14.42	84.8	0.61	
11.43	223.8	2.57		15.24	324.6	5.76	HJ	15.33	80.1	0.60	
12.41	222.5	2.53		15.32	326.6	5.65		15.40	77.9	0.66	
12.41	224.2	2.51	HF	14.25	324.7	5.95	WB	14.32	81.5	0.84	HF
	Σ 1647			14.33	324.3	5.95		19.42	82.0	0.77	
1912.31	227.3	1.34	SC	14.38	326.0	6.01	B		Σ 1695		
12.33	227.0	1.35		14.42	323.2	5.78		1913.21	284.9	3.64	SC
13.21	230.1	1.41		19.36	322.1	6.25	JJ	14.45	285.6	3.62	
12.44	221.9	1.26	HF	19.38	324.9	6.33			Σ 1696		
13.39	222.9	1.43		19.36	319.2	5.98	HF	1911.40	204.3	3.12	WB
19.36	222.8	1.51			Hu. 892			11.41	201.1	3.41	
10.32	225.4	1.31	WB	1910.34	156.6	0.97	WB		Σ 1699		
10.35	223.1	1.43		10.36	153.7	0.72		1910.32	6.9	1.32	WB
10.35	224.7	1.31			Σ 1672			10.34	3.2	1.24	
10.35	227.3	1.44		1911.52	313.9	4.22	L	11.42	2.2	1.52	
12.31	223.8	1.58			Σ 1674			11.43	3.6	1.51	
12.37	222.9	1.30		1912.31	173.1	2.30	WB	12.31	3.4	1.61	
13.31	226.7	1.36		12.37	172.6	2.14		12.31	4.3	1.48	
13.41	226.3	1.51			Hu. 893			12.32	3.3	1.71	
14.40	226.0	1.45		1910.34	33.9	1.30	WB	13.31	4.6	1.33	
19.36	222.5	1.76	JJ	10.36	34.5	1.50		13.33	2.5	1.57	
19.38	222.7	1.81		10.40	26.7	1.15		13.34	1.2	1.23	
19.39	226.7	1.85		12.31	32.0	1.63		14.24	4.5	1.34	
	A.G. 179				Σ 1680			14.29	2.6	1.60	
1912.41	135.5	1.06	HF	1912.41	339.9	2.95	HF	14.29	1.2	1.41	
13.39	131.9	0.77						12.44	3.1	1.49	HF
14.39	136.1	0.81						14.39	4.7	1.56	
								12.31	2.7	1.70	SC
								14.45	4.0	1.53	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Σ 1700				β 930				Σ 1733		
1910:32	83°0	7.18	WB	1913:48	119.2	2.73	B	1919:38	126.3	4.90	HF
10:36	83.4	7.20									
12:44	83.4	1.19	HF								
	Hn. 14				Hu. 1143				β 800		
1914:32	264.7	2.88	HF	1914:39	93.8	1.04	HF	1910:32	117.2	3.33	WB
				14:40	97.1	1.02	WB	10:36	108.8	3.15	
	β 112							10:36	110.9	3.49	
1912:44	294.5	1.97	HF		O Σ 260			13:29	108.0	3.50	
				1910:39	128.4	0.75	L	13:33	108.6	3.50	
				10:52	122.3	0.79		14:24	105.6	3.47	
				11:39	136.3	0.78		14:30	106.9	3.86	
				14:38	127.1	0.83	B	14:33	109.2	3.84	
	Barnard 6							14:40	109.8	3.81	
1910:32	44.2	2.61	WB		Σ 1724			13:39	111.5	3.05	HF
10:36	42.0	2.64		1915:32	345.7	7.08	HJ	13:40	110.5	3.30	
					A-C			14:39	114.7	3.84	
				1915:32	297.6	71.71	HJ	19:40	111.5	3.93	
	Σ 1709							14:21	108.5	3.74	B
1910:32	253.1	2.18	WB		Σ 1727				A. G. 186		
10:35	252.4	2.39		1914:39	333.5	7.30	HF	1910:35	305.0	3.72	HF
	Σ 1711				Σ 1728			1914:48	O Σ 263		
1910:45	339.5	0.97	WB	1910:40	7.3	0.33	WB	1912:31	186.2	1.30	SC
12:31	343.2	1.00		12:31	13.1	0.32		14:45	185.6	0.84	WB
14:40	339.8	0.99		12:32	12.4	0.21		14:38	190.2	1.29	B
14:42	336.5	0.96		13:29	11.4	0.22		10:35	184.6	0.97	HF
14:38	344.8	1.06	B	13:33	14.0	0.29					
12:44	351.0	0.87	HF	13:39	7.8	0.27			Σ 1734		
14:32	353.5	0.92		14:24	11.7	0.38		1911:52	Hu. 644		
14:38	351.1	0.92		14:33	11.3	0.37			87.7	1.38	L
19:42	354.2	0.84		14:34	9.7	0.33					
	β 341			14:45	9.1	0.33			Ho. 260		
1912:33	308.8	0.91	SC	12:43	12.4	0.29	B	1910:36	323.1	0.57	WB
15:33	312.4	0.88	B	12:46	11.7	0.20		10:45	324.4	0.65	
15:40	315.2	0.71		14:42	18.5	0.49		11:34	329.4	0.57	
				15:33	11.0	0.42		11:41	335.0	0.53	
	Σ 1714			15:40	19.3	0.55		11:42	325.9	0.64	
1910:32	305.4	2.83	WB	19:36	12.1	0.43	HF	12:39	327.0	0.81	
10:35	305.7	3.14						12:41	330.9	0.68	
11:41	306.3	2.90			O Σ 261			14:34	331.0	0.59	
11:43	307.4	3.00		1913:21	345.0	2.09	SC	14:45	331.4	0.60	
12:31	306.0	3.17		14:45	345.8	1.82		13:43	331.4	0.76	HF
13:41	306.4	3.65		14:28	345.0	1.83		19:46	339.4	0.62	
14:24	304.9	2.83		14:30	341.1	2.34	HJ				
14:29	306.6	3.29		10:34	347.7	1.45	WB		Σ 1742		
14:30	303.9	3.29		10:35	343.9	1.66		1914:38	350.9	1.47	B
14:31	307.1	3.46	HF	10:35	343.4	1.84					
14:39	309.4	3.14		10:45	345.4	1.65			β 237		
				11:41	342.3	1.65		1910:32	202.5	2.59	WB
	β 929			11:43	346.4	1.63		10:36	204.6	2.69	
1912:32	211.6	0.47	B	12:39	344.4	1.60		13:38	205.1	2.82	
12:43	213.4	0.50		12:41	342.6	1.77		14:33	202.2	2.74	
14:42	209.9	0.60		13:33	343.9	1.65		14:34	204.3	2.76	
15:33	223.0	0.55		13:36	346.8	1.76		14:40	203.8	2.78	
15:40	211.4	0.77		14:30	341.3	1.74		14:39	207.5	2.92	HF
12:33	218.3	0.74	SC	14:45	344.9	1.81					
19:42	209.0	0.60	HF	19:44	344.7	1.62	HF		O Σ 266		
				19:45	345.0	1.38		1912:31	345.2	1.97	SC
				19:46	343.9	1.97		10:32	341.8	1.71	WB
	Σ 1712							10:34	344.3	1.56	
1914:30	152.4	9.42	WB		Σ 1730			11:34	343.9	1.62	
14:33	150.5	8.86		1911:41	331.4	1.76	WB	11:46	341.2	1.50	
				11:43	336.7	1.71		12:37	341.4	1.71	
	Ho. 257			12:39	332.9	1.92		12:38	342.1	1.70	
1910:39	155.7	2.11	L	13:36	333.5	1.68					
10:52	151.7	2.10		13:41	343.4	1.74					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
β 937				Σ 1806				Σ 1819— <i>continued.</i>			
1910.45	113.6	0.74	WB	1914.48	175.0	13.36	SC	1914.38	348.6	1.31	B
11.41	112.6	0.72						19.38	337.0	1.71	JJ
11.42	119.5	0.87		Σ 1809				19.40	341.1	1.41	
11.43	111.6	0.81		1914.48	199.1	5.08	SC	19.44	340.1	1.52	
12.39	118.2	0.79						19.40	342.9	1.00	HF
14.47	116.0	0.96		Σ 1814				Σ 1826			
14.48	112.4	0.91		1914.48	257.0	11.00	SC	A-B			
14.49	113.0	0.90						1911.52	313.0	4.54	L
14.49	118.8	0.81		$O\Sigma$ 277				14.48	314.1	4.24	SC
14.49	116.8	1.00	SC	A-B				14.49	322.0	4.43	
19.46	115.9	0.72	HF	1910.45	2.8	0.44	WB	A-C			
Σ 1795				11.42	0.9	0.29		1914.48	354.8	43.89	SC
1914.48	2.3	7.82	SC	11.43	0.1	0.33		14.49	355.2	43.57	
A. 687				11.52	0.8	0.31		Σ 1824			
1911.42	316.1	0.96	WB	11.53	0.9	0.37		1910.36	282.0	5.31	WB
11.43	306.4	0.80		12.32	2.8	0.43		10.40	279.6	5.61	
11.46	302.9	0.80		12.50	1.7	0.38		14.30	280.0	5.09	
11.52	310.0	0.98		12.51	3.8	..		14.42	279.2	5.35	
14.30	316.9	0.65		12.53	0.2	0.52		14.45	280.6	5.44	
12.44	308.6	0.95	HF	14.34	7.5	0.28		Σ 1829			
A. 569				14.40	1.3	0.36		1911.52	152.6	5.64	L
1911.42	123.6	0.57	WB	14.46	359.1	0.31		14.48	151.0	5.61	SC
11.43	113.7	0.42		14.46	359.0	0.34		14.49	150.4	5.43	
11.46	108.7	0.42		$\frac{AB}{2} - C = \Sigma$ 1812				Howe 32			
11.52	111.7	0.44		1910.45	108.6	14.15	WB	1910.32	192.9	4.20	WB
12.32	100.8	0.51						10.36	192.2	4.41	
12.44	114.0	0.69	HF	$O\Sigma$ 278				10.36	192.5	4.67	
Swift				1910.24	72.0	0.23	B	11.45	192.2	4.76	
1914.48	11.1	2.92	SC	10.32	76.4	0.27		11.52	194.6	4.42	
14.49	11.4	3.03		11.39	66.6	0.32		12.38	191.2	4.79	
A.G. 192				11.43	81.7	0.34		12.54	191.8	4.77	
1911.44	188.2	3.09	HF	11.51	82.2	0.22		A. 147			
β 1270				12.43	69.5	0.34		1911.52	103.6	0.62	L
1913.38	131.0	0.11	WB	12.46	67.5	0.31		β 1271			
Σ 1802				12.49	81.6	0.35		1911.52	352.3	2.90	L
1913.16	282.5	5.29	B	14.46	68.7	0.27		β 1272			
A. 346				15.40	70.0	0.26		A-B			
1912.44	336.1	0.81	HF	15.41	70.2	0.24		1914.48	135.4	1.16	SC
13.40	337.7	0.75		11.42	67.0	0.31	WB	14.49	132.5	1.49	
$O\Sigma$ 276				11.43	71.4	0.24		14.52	134.2	1.35	
A-B				12.39	77.6	0.43		A-C			
1910.45	202.0	0.45	WB	12.53	57.4	0.35		1914.48	321.5	23.71	SC
11.41	200.9	0.49		β 224				14.49	321.8	23.98	
11.42	199.1	0.42		1911.44	63.7	0.77	HF	14.52	321.8	23.73	
11.43	193.3	0.36		12.44	63.3	0.59		Σ 3083			
12.39	196.2	0.57		13.40	56.8	0.55		1910.40	231.0	4.88	WB
12.50	194.2	0.51		Σ 1820				Ho. 541			
12.53	190.3	0.45		1914.48	84.4	2.19	SC	1910.32	89.1	1.74	WB
14.47	193.4	0.69		14.49	84.4	2.32		10.35	94.7	1.94	
14.48	191.9	0.62		Σ 1819				10.36	97.2	2.65	
14.49	192.8	0.60		1910.36	347.1	1.07	WB	14.40	92.5	2.43	
14.49	187.1	0.69		10.40	345.2	1.39		14.42	100.8	2.27	
$\frac{AB}{2} - C$				11.39	347.1	1.12		13.40	95.4	2.50	HF
10.45	72.5	9.44		11.47	346.1	1.13					
11.41	70.8	9.56		12.38	349.7	1.30					
11.43	75.0	9.73		13.39	347.4	1.43					
				14.42	342.5	1.24					
				14.45	341.1	1.21					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 1834				Σ 1846				Σ 1867			
1910.24	95.9	0.26	B	1914.38	112.4	4.73	B	1914.38	12.3	1.35	B
10.32	101.1	0.18						13.40	13.2	1.14	HF
11.39	87.7	0.21		Σ 1853				Σ 1865			
11.43	110.8	0.12		1910.36	83.9	2.53	WB	1910.43	138.7	0.62	L
11.51	107.9	0.16		14.42	85.7	2.59	HF	10.47	137.1	0.63	
12.43	89.2	0.17		13.40	83.8	2.65	HF	11.33	137.2	0.42	
12.46	89.5	0.15		A.G. 195				10.67	137.7	0.56	HF
12.49	94.7	0.16		1913.40	159.4	2.13	HF	10.69	138.6	0.64	
13.49	101.4	0.12		Σ 3086				13.40	141.6	0.68	
13.65	109.9	0.23		1910.36	269.1	5.64	WB	10.24	136.7	0.64	B
14.46	106.8	0.11		10.40	271.0	5.71		10.34	139.7	0.52	
14.55	98.9	0.19		11.45	272.1	5.78		11.39	135.4	0.65	
15.40	96.3	0.22		12.37	270.6	6.20		11.43	138.9	0.62	
15.41	98.6	0.20		12.38	271.4	5.81		12.32	135.0	0.67	
15.52	97.2	0.19		A. 570				12.43	138.2	0.59	
19.62	94.9	0.28	WB	1912.32	117.8	0.21	WB	13.37	134.9	0.57	
11.42	60.2	0.14		12.50	115.7	0.27		13.42	137.7	0.68	
11.57	61.9	0.23		13.38	113.5	0.19		13.46	142.6	0.74	
Espin 19				14.46	98.7	0.19		14.42	138.6	0.60	
A-B				14.46	97.5	0.21		14.46	136.8	0.60	
1914.48	229.0	1.68	SC	14.47	101.3	0.28		15.33	138.3	0.63	
14.49	229.8	1.59		10.34	138.3	0.16	B	15.40	142.3	0.72	
A-C				10.38	148.2	0.21		15.53	136.7	0.59	
1914.48	170.0	40.85	SC	11.39	119.4	0.25		13.40	144.2	0.82	SC
14.49	170.8	41.13		11.43	113.9	0.16		12.32	137.4	0.54	WB
Σ 1839				11.51	117.9	0.28		12.43	136.8	0.48	
1914.49	82.1	14.88	SC	12.32	116.6	0.22		13.38	136.6	0.50	
β 615				12.43	115.0	0.22		14.34	138.5	0.31	
1914.48	235.5	3.33	SC	12.46	114.0	0.21		14.46	136.9	0.73	
14.49	235.6	2.99		12.49	108.0	0.21		14.46	136.0	0.55	
β IIII				14.42	94.9	0.21		$O\Sigma$ 284			
B-C				14.46	96.8	0.12		1910.69	100.3	7.28	HF
1915.41	131.2	0.16	B	14.55	74.0	0.17		Σ 1866			
15.52	131.9	0.13		15.33	90.3	0.22		1910.47	202.6	0.83	L
12.32	70.1	0.27	WB	15.40	80.8	0.27		12.43	201.8	0.80	WB
A-B = Σ 1835				β 94I				12.54	193.2	0.72	
1910.40	189.8	6.45	WB	1913.40	213.5	0.65	HF	Σ 1871			
12.32	188.1	6.21		Σ 3087				1913.49	297.0	1.49	B
A - $\frac{BC}{2}$				1910.32	45.5	1.71	WB	Hu. 575			
1915.32	184.4	6.22	HJ	10.35	49.8	1.72		1919.42	206.5	0.52	HF
Σ 1837				Σ 1863				Küstner 48			
1913.37	306.3	1.34	B	1910.24	88.9	0.64	B	1910.36	133.0	6.74	WB
A. II05				10.34	83.2	0.50		10.40	134.8	6.56	
1910.45	185.8	0.87	WB	11.39	84.4	0.64		Σ 1877			
12.39	182.6	1.00		11.43	84.5	0.63		1910.67	324.8	2.67	HF
12.53	190.2	0.96		12.43	88.5	0.72		10.69	326.7	2.40	
12.54	182.1	0.72		12.46	83.6	0.59		13.40	333.5	2.86	
14.47	179.7	0.88		12.49	90.8	0.63		14.42	331.5	2.81	WB
14.48	187.3	0.83		Howe 34				14.45	328.8	2.92	
14.49	187.0	0.94		1910.32	14.7	2.36	WB	14.38	332.3	2.85	B
14.49	180.4	0.93		10.35	15.4	2.32		14.42	331.5	2.81	
12.44	190.7	0.95	HF	10.35	12.7	2.33		12.31	334.3	3.09	SC
Ho. 542				Σ 1864				12.36	341.1	3.11	
1913.40	257.4	0.78	HF	1910.43	102.2	5.99	L	13.40	330.5	3.15	
13.43	257.2	0.63		10.47	102.0	6.50		14.30	330.1	2.90	HJ
				12.43	104.1	5.87	WB	15.32	330.5	2.98	
				12.44	103.7	5.80					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Σ 1876				Σ 1888— <i>continued.</i>				Σ 1891		
1913:37	74 ^o .8	1 ^{''} .37	B	1919:41	78 ^o .0	2 ^{''} .21	HF	1914:38	237.7	3 ^{''} .78	B
	Σ 1879			19:42	73.7	2.52			A. 2072		
1910:43	123.8	0.60	L	10:36	137.1	2.01	WB	1910:43	300 ^o .4	0 ^{''} .74	L
12:32	116.9	0.76	WB	10:40	138.7	2.10			Hu. 745		
12:38	121.2	0.81		13:33	116.5	2.04		1910:42	23.9	0.62	HF
13:38	123.2	0.72		13:38	116.6	2.11		11:44	22.7	0.51	
14:34	114.8	0.71		14:40	105.8	2.11		12:44	22.7	0.51	
14:46	117.8	0.69		14:45	107.6	1.94			Σ 1909		
14:46	119.4	0.65		12:31	132.3	2.75	SC	1911:62	247.6	4.11	L
10:34	125.0	0.62	B	12:54	127.7	2.21		10:69	245.3	4.21	HF
10:53	124.6	0.60		13:40	121.8	2.39		14:61	245.8	4.24	SC
11:39	122.4	0.72		15:32	97.8	2.29	HJ		Σ 1908		
11:43	122.5	0.74		19:40	74.1	2.28	JJ	1910:45	140.0	1.42	WB
12:43	124.1	0.73		19:44	76.8	2.69		11:52	149.6	1.38	
12:46	119.6	0.62						11:53	144.2	1.33	
13:46	116.9	0.78		1910:43	266.5	0.82	L	12:50	143.7	1.29	
14:46	119.3	0.74		10:47	276.3	0.81		12:53	145.9	1.54	
15:33	111.7	0.79							Σ 1907		
15:40	113.2	0.77			β 31			1910:35	5.7	1.14	WB
12:33	121.0	0.85	SC		A-B			10:35	4.3	0.98	
19:42	114.2	0.84	HF	1910:35	197.2	1.41	WB	12:38	2.5	1.12	
19:46	116.6	0.69		10:35	196.3	1.49		12:38	4.9	1.12	
19:44	111.1	1.15	JJ	14:38	196.0	1.72	B	12:44	7.9	1.05	HF
19:45	116.6	1.13		13:40	202.5	1.63	HF		Σ 1910		
	$\Omega\Sigma$ 285				A-C			1910:35	212.0	4.38	HF
1910:34	108.4	0.28	B	1910:35	159.5	9.14	WB	11:44	207.0	4.09	
10:38	102.8	0.33			$\Omega\Sigma$ 287			12:44	211.6	4.58	WB
11:39	108.6	0.43		1911:52	143.5	0.87	WB	14:40	211.2	4.17	
11:43	106.9	0.35		11:53	142.0	0.83		14:45	209.3	4.11	
12:43	107.3	0.27		12:50	142.7	0.73			Σ 1911		
12:46	98.7	0.49		12:53	143.6	1.00		1910:35	293.8	1.72	WB
12:49	106.0	0.34		12:54	139.9	0.87		10:35	290.5	1.83	
14:46	99.2	0.37		14:48	140.5	0.99			A. III4		
15:40	96.8	0.37		14:49	146.8	0.87		1914:61	294.1	0.96	SC
15:41	99.9	0.38		14:49	147.3	0.86			Σ 1912		
19:62	91.4	0.28		14:49	147.3	0.86		1910:44	154.1	6.54	HF
14:47	103.2	0.30	WB	14:61	150.1	0.92	SC	11:44	155.5	6.98	
14:49	104.1	0.35		14:38	143.3	1.14	B		Hu. 143		
14:49	101.6	0.40		19:62	148.0	0.89		1914:61	129.3	0.91	SC
	Lewis			10:67	146.0	0.82	HF		A. 690		
1915:33	111.8	0.21	B	10:69	146.5	0.86		1910:45	350.3	0.92	WB
15:41	109.4	0.21			A. 2071			11:52	355.4	0.91	
	Σ 1883			1910:43	266.5	0.82	L	11:53	354.8	0.98	
1914:34	225.0	0.31	WB	10:47	276.3	0.81		12:38	355.9	1.01	
14:46	216.9	0.28			$\Omega\Sigma$ 288			12:53	3.5	0.89	
14:46	228.9	0.22		1910:43	188.7	1.67	L	12:53	355.9	0.78	
10:34	229.6	0.37	B	12:31	189.6	1.67	SC	14:49	356.5	0.92	
10:53	235.5	0.33		13:40	187.9	1.79			A. III6		
11:39	232.0	0.41		10:32	188.8	1.37	WB	1910:34	21.0	0.36	B
11:43	231.6	0.37		10:35	187.2	1.60		10:53	19.8	0.42	
12:43	233.3	0.36		11:51	186.5	1.34		11:39	25.6	0.42	
12:46	230.8	0.29		11:53	186.2	1.59		11:43	30.2	0.41	
14:46	225.3	0.39		12:38	187.8	1.65		12:43	26.9	0.49	
15:40	221.4	0.39		12:38	187.7	1.66					
15:41	222.7	0.37		13:42	187.5	1.50					
12:33	237.3	0.64	SC	13:42	185.8	1.56					
	Σ 1888			14:40	185.5	1.57					
1910:42	140.8	2.03	HF	10:42	192.6	1.52	HF				
10:44	143.7	2.33		10:44	188.9	1.44					
11:44	135.9	2.26		13:40	193.1	1.82					
				19:41	183.7	1.66					
				19:48	185.6	1.89	JJ				

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 1998				Σ 2021— <i>continued.</i>				Hu. 481			
1910·47	334·2	0·43	B	1913·43	335·0	"	WB	1910·41	223·2	0·42	WB
10·53	323·0	0·51		14·48	335·2	3·77		11·53	219·0	0·37	
11·39	335·6	0·60		14·52	334·9	3·82		11·53	219·3	0·36	
11·43	334·4	0·51		11·44	336·0	3·84	HF	11·57	215·0	0·55	
12·43	344·5	0·71		11·52	341·7	3·96		13·42	203·0	0·52	
12·46	338·5	0·74		11·57	335·0	3·82		13·43	202·9	0·65	
12·49	348·5	0·69		12·47	340·8	3·93		13·58	215·1	0·61	
15·41	347·2	0·78		11·53	344·6	4·21	SC	13·65	204·7	0·60	
β 811				11·56	333·8	4·05		14·42	201·2	0·27	
1910·42	217·4	3·61	HF	14·65	335·8	4·21		14·46	212·3	0·37	
β 812				14·67	335·6	4·15		14·46	210·8	0·34	
1911·44	117·7	0·76	HF	Σ 2023				14·52	205·4	0·51	
12·47	117·9	0·90		1913·48	226·2	1·66	HF	11·76	226·5	0·61	HF
11·47	120·4	0·55	WB	14·67	227·1	1·82	SC	Küstner 53			
11·53	121·2	0·68		Σ 2032				1910·73	230·5	5·52	HF
12·37	129·3	0·82		A-B				β 951			
12·38	118·8	0·72		1911·58	212·6	4·99	L	1911·53	46·8	1·01	WB
12·33	117·2	0·83	SC	11·62	217·5	4·91		11·53	47·1	0·98	
12·54	118·0	0·87		10·73	216·9	4·96	HF	12·54	39·3	0·87	
β 949				11·76	215·7	4·79		12·77	40·5	0·81	
1910·47	38·2	0·13	B	19·59	216·4	5·06		14·47	47·0	0·81	
10·53	41·0	0·20		19·60	217·0	5·02		14·49	49·7	0·99	
11·39	14·6	0·17		13·58	217·2	4·98	WB	14·49	50·9	1·05	
11·43	11·9	0·16		13·65	216·2	4·86		10·69	51·7	0·91	HF
12·43	45·4	0·16		14·49	217·6	5·14		11·76	51·3	0·80	
12·46	13·2	0·10		11·56	217·2	5·17	SC	Σ 310			
12·49	16·1	0·16		11·53	223·0	4·95		1910·69	223·1	3·00	HF
15·41	13·9	0·24		11·65	221·5	5·14		10·79	226·9	2·89	
Σ 2010				14·61	216·7	5·25		11·76	225·5	3·15	
1914·65	191·3	29·13	SC	14·65	219·1	5·16		A. 226			
14·67	192·1	28·98		A-D				1910·79	112·5	0·83	HF
β 120				1911·58	80·7	66·45	L	β 815			
1910·47	9·1	0·96	B	11·62	85·7	64·52		1910·79	335·8	10·47	HF
10·53	12·0	0·73		13·65	86·0	65·05	WB	11·76	334·5	10·72	
15·41	6·5	0·93		14·61	86·5	66·09	SC	Σ 2049			
Mitchell= β 120 C-D				14·65	85·9	64·82		1912·37	203·7	1·13	WB
1910·47	47·0	1·96	B	Hu. 480				12·38	204·9	1·30	
10·53	47·9	2·05		1910·44	252·8	1·53	HF	11·53	212·7	1·23	SC
15·41	50·3	2·24		11·44	255·6	1·38		11·56	208·1	1·13	
Σ 306				Σ 2026				1919·46	104·3	0·39	HF
1911·53	33·8	0·31	WB	Hu. 1172				11·56	208·8	1·09	
11·57	35·2	0·30		1910·67	325·7	1·60	HF	12·31	208·8	1·09	
11·67	36·6	0·40		10·69	326·5	1·62		12·33	209·1	1·53	
Σ 2022				10·73	325·4	1·62		12·54	208·0	1·29	
1911·54	142·4	2·57	L	11·76	327·8	1·67		12·47	201·8	1·20	HF
11·51	139·4	2·33	WB	Hu. 661				β 813			
11·52	137·8	2·43		1910·73	54·5	0·56	HF	1912·37	163·8	1·04	WB
12·38	138·2	2·68		11·76	49·4	0·80		12·38	166·0	1·10	
12·51	135·9	..		Σ 309				12·53	168·8	1·03	SC
12·53	139·9	2·26		1910·34	247·2	0·44	B	12·54	168·1	0·98	
Σ 2021				10·38	250·5	0·36		12·56	166·2	1·24	
1913·33	338·3	3·96	WB	11·43	249·8	0·31		12·47	170·7	1·00	HF
13·42	337·8	3·93		11·51	244·2	0·38		Σ 2052			
13·42	336·1	3·81		12·49	249·5	0·44		1911·54	87·8	0·98	L
				19·62	246·4	0·41		12·47	83·0	1·00	HF
								19·59	31·2	0·32	
								19·60	29·0	0·29	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 2052—continued.				Σ 2058—continued.				Σ 2082			
1912:54	82°3	0.98	SC	1913:42	346.4	2.00	WB	1910:79	91.0	24.99	HF
12:37	78.2	0.93	WB	13:57	341.7	1.40			A. 349		
12:38	81.1	0.88		14:42	344.1	1.65		1910:79	112.4	0.68	HF
13:33	75.4	0.68		14:52	346.7	1.78			Σ 2084		
13:42	79.8	0.75			β 816			1910:67	144.1	1.25	WB
13:42	80.7	0.72		1910:69	222.8	5.28	HF	10:72	145.0	1.18	
13:43	75.8	0.98		10:79	222.8	4.50		10:75	144.8	1.36	
14:42	79.3	0.38		11:69	224.4	5.23		11:53	134.2	1.09	
14:52	73.9	0.60			$\Omega\Sigma$ 313			11:53	136.4	1.19	
	Hu. 663			1914:47	143.5	1.00	WB	11:57	136.9	1.21	
1910:79	235.6	2.65	HF	14:49	145.9	0.90		12:42	123.9	1.28	
	Hu. 748			14:49	141.5	0.98		12:45	126.5	1.34	
1910:79	81.8	11.48	HF	14:69	144.9	0.97	SC	12:53	131.0	1.33	
	Hu. 1173			10:34	148.3	0.91	B	12:76	127.4	1.30	
1910:34	63.9	0.21	B	10:38	147.8	0.91		13:58	120.5	1.33	
10:53	66.9	0.20		11:43	148.3	0.93		13:65	123.9	1.20	
11:43	61.0	0.19		11:51	147.9	1.08		14:47	110.0	1.31	
11:51	75.1	0.14		11:76	146.3	0.83		14:48	110.2	1.34	
11:76	44.6	0.24		12:49	144.5	1.08		14:49	111.9	1.46	
12:49	71.4	0.37		15:41	144.5	0.79		11:51	140.3	1.15	B
15:41	64.9	0.15		15:65	141.8	0.93		11:53	141.0	1.24	
15:65	62.0	0.26			Σ 2061			11:76	132.6	0.95	
	Σ 2055			1911:51	22.7	2.52	WB	12:46	124.0	1.01	
1911:51	72.2	1.11	SE	11:52	23.3	2.61		12:77	125.9	1.27	
11:55	74.1	1.31		11:53	23.0	2.53		14:46	113.0	1.36	
13:33	70.8	1.16	WB	12:53	23.8	2.48		15:41	106.0	1.30	
13:42	69.1	1.17		12:54	25.6	2.88		15:69	111.0	1.21	
13:43	69.8	1.19		11:76	23.0	2.65	HF	11:54	148.3	1.45	L
14:42	72.8	0.92			β 952			11:58	141.4	1.02	
14:52	71.8	1.18		1910:67	145.7	3.77	HF	19:60	88.3	1.59	HF
12:53	73.0	0.93	HF	10:69	145.7	3.74			Hu 487		
13:48	73.6	0.76		10:79	146.8	3.56		1910:53	23.5	0.43	B
19:46	83.9	0.83		11:69	148.3	3.58		11:39	23.7	0.43	
19:44	87.0	1.18	JJ	11:76	149.0	3.03		11:43	25.7	0.48	
	Σ 3105				Σ 2078			11:53	20.9	0.52	
1910:53	30.5	0.37	B	1911:53	111.3	3.72	SC	11:76	16.4	0.60	
11:39	21.4	0.34		11:56	109.9	4.11		12:43	26.7	0.55	
11:43	23.5	0.42		11:65	112.9	3.81		12:46	28.1	0.51	
12:43	36.9	0.31		14:67	112.3	3.50		12:49	14.9	0.48	
12:46	29.1	0.34		14:69	113.6	3.50			Σ 2091		
12:49	27.0	0.39			$\Omega\Sigma$ 314			1911:62	306.3	0.90	L
	Σ 2057			1911:69	234.2	3.69	HF	11:52	306.9	1.13	WB
1910:55	267.2	4.95	WB	12:47	234.1	3.63		11:53	305.7	1.00	
11:67	266.5	4.85		12:43	230.3	3.56	WB	12:53	309.4	1.09	
11:73	263.6	5.11		12:51	233.2	..		12:77	308.5	1.15	
12:37	265.5	5.04		12:54	237.1	3.68		12:77	306.0	0.90	
12:38	266.5	4.97			Hu. 485				Σ 2094		
	Σ 2058			1912:43	276.6	4.29	WB	1910:41	76.6	1.25	WB
1910:41	350.4	1.75	WB		Σ 2080			10:45	78.3	1.41	
10:55	345.5	1.68		1910:79	23.2	2.70	HF	11:51	77.8	1.32	
11:62	348.7	1.83			Hu. 486			11:52	77.7	1.46	
11:67	347.3	1.94		1912:43	142.9	1.10	WB	11:53	75.2	1.42	
12:37	343.7	1.92		12:54	142.6	1.07		12:38	75.8	1.42	
12:38	348.6	1.77		11:69	137.9	1.04	HF	12:38	77.4	1.45	
13:42	342.2	1.53		12:47	146.4	1.09		12:54	79.2	1.59	SC
								11:69	83.7	1.37	HF
								12:53	82.7	1.30	
									A-C		
								1911:69	312.3	25.02	HF

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
De. 15				Σ 2107— <i>continued.</i>				Σ 2114— <i>continued.</i>			
1911-62	276.8	0.43	L	1915-52	28.9	0.60	B	1912-38	165.3	1.21	WB
11-67	282.4	0.45	WB	19-59	31.7	0.61	HF	12-43	165.3	1.12	
11-73	275.8	0.31		19-60	31.5	0.77		13-42	167.2	1.10	
12-77	270.6	0.51		A-C				13-42	176.1	0.91	
19-60	236.2	0.42	HF	1912-44	309.5	82.37	SC	13-43	163.7	1.25	
Σ 2097				Σ 2109				Σ 2121			
1911-69	81.1	2.15	HF	1911-52	313.5	5.70	HF	1911-68	139.2	2.38	SC
11-76	80.1	1.93		A. 350				Perry			
11-52	83.0	2.10	WB	1911-69	148.0	0.42	L	1912-38	230.5	1.88	WB
11-53	82.3	2.06		10-53	139.4	0.37	B	12-43	233.0	1.81	
12-45	83.9	2.00		11-39	137.7	0.39		Σ 2120			
12-53	83.9	1.85		11-43	138.9	0.46		1911-61	240.4	9.36	WB
Espin 76				Σ 318				β 357			
1911-76	45.2	2.64	HF	1912-47	253.9	2.58	HF	1910-41	298.5	1.06	WB
14-67	49.3	2.83	SC	Σ 319			12-38	293.5	1.19		
14-69	46.7	2.56		1912-47	65.4	0.99	HF	12-43	298.3	1.19	
Σ 2101				Σ 3107				A. 228			
1910-29	53.5	4.05	HF	1913-42	94.4	1.25	WB	1912-38	185.4	0.63	WB
11-69	57.3	4.34		13-58	105.6	1.90		12-38	188.9	0.56	
11-76	56.4	4.26		13-48	94.8	1.40	HF	12-42	186.4	0.73	
Weisse 31				Σ 320				Σ 2130			
A-B				1911-69	248.2	5.71	HF	A-B			
1911-52	138.7	5.06	HF	Σ 321			1910-84	138.4	2.06	HF	
11-69	135.9	4.72		1912-47	8.3	0.77	HF	11-68	139.2	2.38	SC
A-C				Σ 2118				14-67	132.6	2.29	
1911-69	245.6	26.59	HF	1910-34	85.1	0.28	B	Hu. 1176			
Küstner 55				Σ 322				1910-53	127.7	0.14	B
1911-69	45.8	2.57	HF	1910-67	197.2	1.45	WB	11-51	143.3	0.14	
Σ 2106				Σ 2114				11-53	146.5	0.27	
1910-53	286.6	0.21	B	1911-54	168.8	1.28	L	11-56	138.6	0.10	
11-39	281.3	0.25		10-41	164.6	1.07	WB	11-76	129.3	0.02	
11-43	278.6	0.19		11-47	165.5	1.20		12-49	121.2	0.15	
12-43	281.2	0.17		11-53	164.7	1.06		12-77	103.5	0.13	
12-46	278.0	0.21		Σ 2114			12-81	105.3	0.20		
12-49	275.0	0.19		1911-54	168.8	1.28	L	15-65	118.7	0.16	
15-41	276.2	0.15		10-41	164.6	1.07	WB	13-65	86.3	0.13	WB
15-52	277.6	0.19		11-47	165.5	1.20		β 1118			
β 821				Σ 2114				Σ 2135			
1910-69	313.2	1.13	HF	1911-54	168.8	1.28	L	1911-52	180.7	7.30	HF
10-79	313.2	1.32		10-41	164.6	1.07	WB	12-49	176.8	7.42	
11-69	311.7	1.24		11-47	165.5	1.20		10-45	177.7	7.44	SE
12-54	311.4	1.25	SC	11-49	164.7	1.06		10-59	180.9	7.35	
Σ 2107				Σ 2114				Σ 2135			
1911-69	18.4	0.62	L	Σ 2114			Σ 2135				
12-44	22.7	0.76	SC	1911-54	168.8	1.28	L	1911-52	180.7	7.30	HF
12-43	25.7	0.49	WB	10-41	164.6	1.07	WB	12-49	176.8	7.42	
12-45	12.1	0.49		11-47	165.5	1.20		10-45	177.7	7.44	SE
12-47	20.8	0.42		11-49	164.7	1.06		10-59	180.9	7.35	
13-65	11.8	0.54		Σ 2114			Σ 2135				
14-47	18.2	0.66		1911-54	168.8	1.28	L	1911-52	180.7	7.30	HF
14-49	28.9	0.67		10-41	164.6	1.07	WB	12-49	176.8	7.42	
14-52	16.9	0.54		11-47	165.5	1.20		10-45	177.7	7.44	SE
10-53	11.5	0.34	B	11-49	164.7	1.06		10-59	180.9	7.35	
11-39	7.3	0.47		Σ 2114			Σ 2135				
11-43	10.5	0.40		1911-54	168.8	1.28	L	1911-52	180.7	7.30	HF
12-46	20.7	0.40		10-41	164.6	1.07	WB	12-49	176.8	7.42	
12-49	16.7	0.45		11-47	165.5	1.20		10-45	177.7	7.44	SE
15-41	24.9	0.63		11-49	164.7	1.06		10-59	180.9	7.35	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 2175				Σ 2196				Σ 2215— <i>continued.</i>			
1911·61	10·3	13·41	WB	1911·61	257·4	3·27	WB	1913·48	283·9	0·82	HF
11·61	7·1	13·27		11·73	257·5	3·50		14·51	282·0	0·81	
Hu. 179				β 1251				β 358			
1910·44	50·6	2·26	HF	1913·58	52·2	1·02	WB	11·47	284·4	0·81	WB
12·53	53·2	1·99						11·49	288·9	0·63	
O Σ 331				Σ 2197				Σ 2203			
1913·48	339·8	0·88	HF	1913·48	178·2	8·01	HF	1913·85	323·7	0·69	HF
13·69	340·8	0·97						10·67	318·0	0·63	WB
Σ 2182				Σ 2205				A. 697			
1912·49	358·8	5·54	HF	1913·85	323·7	0·69	HF	1910·44	201·8	4·39	HF
12·53	0·0	5·20		10·72	319·4	0·44					
11·60	1·5	5·10	WB	10·73	320·5	0·67		1910·79	92·6	0·64	HF
11·62	359·6	4·88		11·53	314·2	0·55					
12·45	359·5	5·31		11·73	317·7	0·51		β 824			
12·47	358·6	5·34		11·79	317·9	0·60		1910·47	1·6	0·61	B
β 1121				A.G. 212				Hu. 1182			
1910·44	234·7	0·70	HF	1913·48	25·5	2·59	HF	1911·68	7·7	0·70	SC
12·47	238·0	0·89									
12·53	238·2	0·81		Ho. 560				O Σ 337			
β 962				Σ 2213				Σ 2205			
1910·82	345·9	1·10	HF	1913·48	25·5	2·59	HF	1914·67	311·8	2·02	SC
13·85	349·8	0·95						11·61	309·1	1·95	WB
13·89	350·0	0·84		1910·73	95·2	0·64	WB	11·62	309·9	1·95	
A.G. 210				Ho. 560				A. 1163			
1910·44	175·5	4·20	HF	10·75	96·3	0·60		1913·48	107·5	0·95	HF
12·47	178·2	4·13		11·68	94·9	0·80	SC	14·51	106·5	0·81	
12·49	171·7	4·41		Σ 2213				Σ 2238			
12·53	175·0	4·17	WB	1911·60	329·4	4·40	WB	1910·82	287·0	2·29	HF
12·54	172·3	3·97		11·61	330·2	4·23		11·53	286·8	1·97	WB
β 631				Σ 2205				A. 1163			
1910·47	57·4	0·33	B	1914·67	311·8	2·02	SC	1913·48	107·5	0·95	HF
10·53	62·9	0·29		11·61	309·1	1·95	WB	14·51	106·5	0·81	
11·51	54·7	0·30		11·62	309·9	1·95		Σ 2238			
11·53	57·5	0·38		12·45	310·6	1·96		1910·82	287·0	2·29	HF
12·46	53·9	0·36		12·47	310·2	2·01		11·53	286·8	1·97	WB
12·74	61·3	0·27		12·47	310·2	2·01		11·62	286·4	1·97	
12·77	54·2	0·22		13·73	311·1	2·10		12·54	287·8	2·11	
14·55	64·4	0·35		13·73	311·4	2·00		12·77	290·5	1·70	
15·53	60·9	0·33		14·62	308·8	2·01		A. 1163			
15·65	54·6	0·22		14·68	311·3	2·07	B	1910·44	104·5	1·18	HF
15·69	56·1	0·26		11·83	308·8	1·81	HF	13·48	107·5	0·95	
Σ 2199				Σ 2217				O Σ 338			
1913·85	86·9	1·57	HF	1911·60	102·0	6·78	WB	1911·56	13·7	0·95	SC
14·67	87·1	1·91	SC	12·51	104·4	..		12·54	16·0	0·97	
12·77	84·5	1·54	WB	12·54	103·1	6·84		11·51	13·4	0·77	B
A.G. 211				Σ 2215				Σ 2215			
1910·44	126·0	2·74	HF	1912·47	284·5	0·67	HF	1912·47	284·5	0·67	HF
12·47	128·2	2·64		12·49	283·9	0·76		12·49	283·9	0·76	
12·49	129·8	2·67		Σ 2215				Σ 2215			
Σ 2193				Σ 2215				Σ 2215			
1911·60	66·7	5·83	WB	1912·47	284·5	0·67	HF	1911·56	13·7	0·95	SC
				12·49	283·9	0·76		12·54	16·0	0·97	
								11·51	13·4	0·77	B
								11·53	14·5	0·81	
								12·46	14·2	0·83	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
O Σ 338— <i>continued.</i>				A.C. 9— <i>continued.</i>				β II27			
1912.49	13.5	0.93	B	1912.53	236.3	0.99	WB	1911.79	133.2	0.87	WB
12.74	14.8	0.75		12.49	235.8	1.04	HF	12.77	125.0	0.90	
14.52	14.7	0.80		11.51	235.7	1.07	SE	10.82	129.3	0.88	HF
14.64	17.5	0.84		11.55	239.6	1.30		13.85	130.4	0.81	
15.53	9.2	0.83						13.89	130.0	0.73	
15.65	9.8	0.85		O Σ 339				Σ 2275			
11.47	7.4	0.55	WB	1911.62	177.3	3.46	WB	1911.58	132.2	0.62	L
11.49	12.6	0.55		11.73	177.6	3.46		11.56	136.3	0.87	B
11.54	9.8	0.57		12.42	176.9	3.44		12.77	133.4	0.52	
12.43	15.2	0.72		12.47	178.2	3.24		12.81	140.2	0.74	
12.47	11.0	0.68		10.47	180.4	3.43	L	Σ 2272			
13.42	7.4	0.54		12.47	179.4	3.13	HF	A-B			
13.53	11.3	0.75		12.49	173.2	3.27		1910.41	153.0	3.41	WB
13.56	9.9	0.65		12.76	177.8	3.15		10.45	154.6	3.67	
13.57	7.0	0.59		β 4I7				10.56	149.4	3.32	
14.47	9.8	0.68		1911.79	277.6	1.26	WB	10.61	148.6	3.06	
14.62	8.6	0.67		11.80	277.2	1.57		10.63	150.3	3.24	
13.48	11.2	0.73	HF	10.82	283.3	1.57	HF	10.67	151.8	3.46	
14.51	8.5	0.64		β I299				10.72	150.5	3.46	
14.74	13.3	0.85		1911.56	150.7	0.44	B	10.72	150.8	3.36	
19.59	12.1	0.63		12.77	149.6	..		10.73	151.4	3.42	
19.60	14.0	0.88		12.81	168.4	0.54		11.43	149.1	3.66	
A. 234				15.53	150.0	0.34		11.47	147.1	3.27	
1911.51	37.5	0.55	B	10.44	152.6	0.58	HF	11.49	149.1	3.65	
11.53	26.8	0.35		14.51	164.1	0.49		11.51	148.8	3.61	
12.49	42.2	0.42		14.74	154.0	0.60		11.52	147.1	3.58	
12.77	32.9	0.43		Σ 2255				11.53	149.2	3.72	
15.53	36.5	0.36		1911.68	341.8	8.96	SC	11.54	149.7	3.56	
A.C. 8				β I202				11.55	147.0	3.63	
1911.51	246.2	0.35	B	1914.51	350.0	0.68	HF	11.55	149.3	3.49	
11.53	242.5	0.38		β II25				11.56	146.2	3.58	
12.49	255.1	0.38		1914.51	24.8	0.80	HF	11.57	149.2	3.56	
12.77	256.7	0.26		β 635				11.58	147.0	3.53	
15.53	242.8	0.31		1914.51	120.5	1.31	HF	11.60	148.8	3.32	
Küstner 56				Σ 2262				12.43	147.0	3.95	
1914.74	129.8	2.58	HF	1913.48	260.6	1.98	HF	12.49	143.4	3.69	
A. 235				Σ 2267				12.51	147.4	..	
1911.51	81.7	0.39	B	1911.58	245.8	0.98	L	12.53	146.1	3.77	
11.53	84.5	0.35		10.67	244.5	0.95	WB	12.54	147.8	3.67	
12.49	84.6	0.44		10.72	245.1	0.88		12.56	146.5	3.72	
12.77	84.0	0.36		10.73	244.4	1.03		12.59	145.3	3.62	
15.53	87.6	0.36		11.68	244.7	1.28	SC	12.65	144.4	3.79	
14.49	93.3	0.34	WB	A. II65				12.73	146.7	3.69	
14.68	87.5	0.28		1914.51	36.4	0.97	HF	12.74	145.1	3.77	
β I30				Ho. 565				12.76	144.1	4.00	
1910.73	119.2	1.56	WB	1911.51	69.5	0.41	B	12.77	146.8	3.87	
10.75	124.9	1.80		11.53	67.9	0.38		12.77	145.7	3.96	
10.76	119.1	1.53		19.59	77.4	0.51	HF	13.53	143.0	4.09	
A.C. 9				19.60	75.4	0.43		13.56	144.3	4.16	
1911.83	234.8	1.19	B	Σ 2272				13.57	142.6	3.98	
10.73	235.9	1.02	WB	1914.51	36.4	0.97	HF	13.58	142.4	4.03	
10.75	239.2	0.84		A. II65				13.58	143.0	4.08	
10.76	233.0	0.89		1914.51	36.4	0.97	HF	13.64	140.2	4.22	
11.62	235.1	1.03		Ho. 565				13.65	145.4	4.27	
11.73	232.2	0.94		1911.51	69.5	0.41	B	13.66	143.9	4.12	
11.74	234.7	1.04		11.53	67.9	0.38		13.73	139.9	4.23	
12.53	238.1	0.95		19.59	77.4	0.51	HF	13.73	144.5	4.02	
				19.60	75.4	0.43		13.79	143.8	3.97	
								13.81	142.8	4.20	
								14.52	141.5	4.26	
								14.54	142.9	4.15	
								14.56	140.3	4.15	
								14.61	138.1	4.53	
								14.62	140.4	4.26	
								14.67	139.3	4.05	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	OΣ 346				Ho. 84				Σ 2339		
1912-74	331 ^o 0	5 ^u 36	WB	1910-70	317 ^o 2	3 ^u 75	L	1911-53	274 ^o 7	2 ^u 38	SC
				11-71	318 ^o 8	3 ^u 56		10-56	271 ^o 6	2 ^u 20	WB
	A.G. 221				Σ 2315			10-72	270 ^o 2	2 ^u 15	
1910-49	192 ^o 1	1 ^u 15	WB	1910-70	190 ^o 6	0 ^u 51	L	11-78	272 ^o 6	2 ^u 00	
10-56	192 ^o 5	1 ^u 22		11-71	193 ^o 2	0 ^u 38		12-59	269 ^o 0	2 ^u 32	
11-78	189 ^o 4	1 ^u 07		10-73	185 ^o 9	0 ^u 27	WB	13-56	270 ^o 2	2 ^u 28	
11-78	187 ^o 6	1 ^u 21		10-76	181 ^o 5	0 ^u 29		14-61	271 ^o 1	2 ^u 21	
12-42	195 ^o 5	1 ^u 34		11-53	183 ^o 3	0 ^u 25		14-67	271 ^o 1	2 ^u 24	
12-53	187 ^o 2	1 ^u 24		11-57	182 ^o 6	0 ^u 27		14-75	273 ^o 1	2 ^u 22	
12-47	194 ^o 5	1 ^u 34	HF	11-58	185 ^o 1	0 ^u 25		A-B=Hu 322			
11-77	187 ^o 8	1 ^u 68	SC	12-59	185 ^o 9	0 ^u 31		1912-59	74 ^o 1	0 ^u 40	WB
	Ho. 430			12-76	175 ^o 6	0 ^u 28		13-56	74 ^o 0	0 ^u 17	
1911-77	192 ^o 7	2 ^u 45	WB	12-77	184 ^o 2	0 ^u 19		14-74	80 ^o 7	0 ^u 27	
11-78	195 ^o 1	2 ^u 12		13-56	182 ^o 3	0 ^u 26		14-75	69 ^o 7	0 ^u 29	
12-42	196 ^o 7	2 ^u 31		13-58	183 ^o 3	0 ^u 28		14-76	72 ^o 9	0 ^u 31	
12-53	192 ^o 9	2 ^u 59		13-65	180 ^o 2	0 ^u 29			OΣ 359		
13-57	188 ^o 9	2 ^u 05		14-52	178 ^o 0	0 ^u 20		1911-53	332 ^o 0	0 ^u 26	WB
11-68	196 ^o 6	2 ^u 74	SC	14-54	188 ^o 7	0 ^u 28		11-55	316 ^o 8	0 ^u 25	
	β 641			14-66	175 ^o 1	0 ^u 28		11-57	330 ^o 8	0 ^u 31	
1910-70	341 ^o 0	0 ^u 85	L	14-68	184 ^o 0	0 ^u 29	HF	11-58	334 ^o 1	0 ^u 27	
11-71	353 ^o 2	0 ^u 83		14-74	190 ^o 7	0 ^u 29		12-49	318 ^o 7	0 ^u 22	
12-47	341 ^o 9	1 ^u 05	HF		β 1203			12-56	315 ^o 7	0 ^u 25	
11-77	352 ^o 3	0 ^u 94	WB	1911-53	85 ^o 6	0 ^u 23	B	12-59	331 ^o 8	0 ^u 28	
11-80	345 ^o 3	1 ^u 00		11-56	70 ^o 3	0 ^u 30		12-78	339 ^o 8	0 ^u 29	
12-54	342 ^o 5	0 ^u 87			Σ 2317			13-53	324 ^o 8	0 ^u 30	
12-54	340 ^o 8	1 ^u 01			B-C=L23			13-57	332 ^o 8	0 ^u 24	
	Lewis 21			1910-70	138 ^o 8	1 ^u 21	L	13-58	317 ^o 2	0 ^u 24	
1911-71	104 ^o 8	6 ^u 34	L	11-71	138 ^o 7	1 ^u 21		13-58	332 ^o 1	0 ^u 16	
	A.G. 222				Σ 2323			13-58	332 ^o 1	0 ^u 16	
1910-56	140 ^o 9	1 ^u 38	WB	1910-45	356 ^o 4	3 ^u 65	SE	13-65	335 ^o 9	0 ^u 22	
10-72	141 ^o 8	1 ^u 48		10-59	359 ^o 2	3 ^u 76		14-67	326 ^o 7	0 ^u 27	
13-42	139 ^o 6	1 ^u 69			β 134			14-74	351 ^o 3	0 ^u 24	
13-53	143 ^o 4	1 ^u 75		1910-73	133 ^o 1	0 ^u 96	WB	14-75	347 ^o 0	0 ^u 31	
14-54	141 ^o 4	1 ^u 68		11-79	138 ^o 5	1 ^u 07		15-65	317 ^o 7	0 ^u 12	B
14-61	142 ^o 0	1 ^u 57		11-80	131 ^o 6	1 ^u 15			OΣ 357		
14-62	141 ^o 8	1 ^u 58		13-85	145 ^o 0	1 ^u 06	HF	1910-70	233 ^o 8	0 ^u 29	L
14-74	145 ^o 6	1 ^u 59	HF	13-89	137 ^o 5	0 ^u 87		10-56	234 ^o 0	0 ^u 33	WB
12-54	146 ^o 8	2 ^u 06	SC		OΣ 350			10-63	235 ^o 5	0 ^u 28	
	Lewis 20			1914-74	167 ^o 6	1 ^u 81	HF	10-72	234 ^o 3	0 ^u 31	
1911-71	332 ^o 0	3 ^u 06	L		β 464			11-59	238 ^o 0	0 ^u 34	
11-77	336 ^o 0	1 ^u 81	WB	1914-74	113 ^o 0	0 ^u 93	HF	11-62	242 ^o 1	0 ^u 23	
11-78	336 ^o 6	1 ^u 65			Hu. 320			11-63	231 ^o 4	0 ^u 27	
13-57	337 ^o 1	1 ^u 71		1913-73	145 ^o 3	1 ^u 85	WB	12-44	240 ^o 8	0 ^u 59	
	Σ 2314			13-73	142 ^o 2	1 ^u 71		12-47	227 ^o 7	0 ^u 25	
1911-61	325 ^o 6	2 ^u 19	WB		Hu. 244			12-49	232 ^o 9	0 ^u 60	
11-62	326 ^o 0	2 ^u 21		1912-47	257 ^o 6	0 ^u 94	WB	12-54	243 ^o 4	0 ^u 56	
12-42	329 ^o 7	2 ^u 19			Hu. 245			12-59	227 ^o 1	0 ^u 40	
12-51	325 ^o 2	..		1910-56	53 ^o 1	2 ^u 03	WB	13-53	225 ^o 4	0 ^u 29	
12-53	329 ^o 9	2 ^u 29		10-72	53 ^o 6	2 ^u 10		13-56	234 ^o 5	0 ^u 39	
12-53	324 ^o 7	2 ^u 24		11-62	54 ^o 0	1 ^u 97		13-57	236 ^o 3	0 ^u 33	
	Ho. 83			11-62	52 ^o 8	2 ^u 29		13-58	234 ^o 9	0 ^u 37	
1911-71	99 ^o 4	0 ^u 78	L	11-63	52 ^o 4	1 ^u 88		14-54	235 ^o 4	0 ^u 28	
11-53	87 ^o 6	0 ^u 49	WB	12-47	53 ^o 0	1 ^u 95		14-62	233 ^o 9	0 ^u 53	
11-54	88 ^o 7	0 ^u 42		12-49	52 ^o 8	2 ^u 39		11-53	248 ^o 2	0 ^u 39	B
12-53	78 ^o 8	0 ^u 55		12-74	50 ^o 1	1 ^u 74		11-56	235 ^o 1	0 ^u 34	
12-76	88 ^o 3	0 ^u 59		10-62	53 ^o 6	2 ^u 67	L	15-65	221 ^o 4	0 ^u 45	
14-52	90 ^o 0	0 ^u 62		10-70	53 ^o 4	2 ^u 70		15-69	228 ^o 9	0 ^u 30	
									OΣ 358		
								1911-53	196 ^o 9	2 ^u 20	SC
								11-65	187 ^o 4	2 ^u 04	
								10-45	189 ^o 2	2 ^u 09	SE
								10-59	191 ^o 3	1 ^u 92	
								19-59	187 ^o 5	1 ^u 98	HF

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	Bird 4				Σ 248I				Σ 249I— <i>continued.</i>		
1910-79	313 ^o	2.48	HF		$\frac{AB}{z}-C$			1910-72	216 ^o .5	1.21	WB
11-77	308.4	2.64	SC		2			11-62	220.0	0.98	
	β 466			1911-65	221.2	4.19	SC	11-73	216.6	1.16	
1911-55	164.2	1.71	WB	11-77	217.6	4.40		11-74	218.8	1.22	
11-59	162.4	1.77		13-82	219.3	4.29	HF	12-42	217.5	1.04	
12-47	165.6	1.63		13-89	220.5	4.39		12-73	218.0	1.15	
12-54	162.4	1.82		10-81	218.9	4.08	WB		A. 156		
11-72	166.2	1.86	HF	10-85	217.5	4.17		1913-53	82.1	0.38	WB
	Ho. 95			11-78	219.4	4.28		13-79	79.2	0.23	
1912-76	217.6	0.34	WB	11-79	216.9	4.19		13-80	71.6	0.34	
	Σ 2454			12-76	218.4	4.34		13-81	75.1	0.35	
1910-81	251.9	0.89	WB	12-76	218.3	4.35		14-67	83.6	0.42	
10-85	250.8	0.72		13-66	215.3	4.05		14-72	76.2	0.48	
11-62	252.8	0.86		13-79	214.2	4.38		14-73	79.3	0.34	
11-73	251.3	0.89		13-81	214.4	4.22			Hu. 336		
11-74	256.7	0.90		14-74	213.4	4.26		1910-55	196.9	1.25	WB
12-76	257.3	0.87		14-75	216.1	4.26		10-63	195.3	1.43	
12-83	251.2	0.66			B-C=Secchi 2			11-62	192.7	1.25	
13-66	258.0	0.86		1913-66	113.9	0.43	WB	11-62	198.8	1.37	
14-75	256.7	0.89		13-79	101.0	0.21		11-63	199.5	1.33	
10-79	246.0	0.78	HF	13-80	103.1	0.28		12-54	193.4	1.29	
13-89	258.0	0.86		14-74	101.7	0.37		14-61	181.6	1.27	
	Σ 2455			14-75	105.6	0.44		14-67	195.4	1.52	
1912-76	72.8	3.49	WB	13-89	98.6	0.45	HF	14-68	184.5	1.54	
12-83	70.8	3.79			β 139			11-72	200.0	1.40	HF
13-68	72.1	3.50	HF		A-B				β 248		
	Σ 2457			1911-72	140.4	0.73	HF	1910-61	129.1	1.86	SE
1910-56	199.5	10.55	L	12-74	139.9	0.70	WB	10-62	126.7	1.96	
12-76	202.3	10.59	WB		Σ 2482			10-71	124.2	1.69	WB
	Σ 2466			1911-55	345.6	1.95	WB	10-72	128.7	1.48	
1910-81	108.7	2.14	WB	11-56	342.0	1.88		13-53	124.7	1.80	
10-85	109.4	2.12		12-47	346.1	1.88		13-58	128.3	1.69	
11-62	107.6	2.25		12-49	343.7	1.88		14-67	131.3	1.50	
11-67	105.7	2.31		11-72	348.6	1.80	HF	14-74	122.5	1.59	
12-76	105.5	2.12			β 975			14-75	126.9	1.74	
12-76	106.3	2.03		1913-89	225.6	0.65	HF	13-68	127.5	1.88	HF
10-45	107.1	2.36	SE		$\cdot O\Sigma$ 368			13-75	129.7	1.74	
10-59	106.9	2.60			A-B			13-82	128.8	1.90	
11-77	95.1	2.42	SC	1911-62	214.7	0.89	WB		β 14I		
	Ho. 570			11-72	214.7	0.78			A-B		
1911-55	222.4	10.60	WB	12-54	214.1	1.03		1913-68	82.7	0.77	HF
11-56	224.9	10.53		12-59	218.2	1.00		13-75	84.8	0.73	
	Ho. 442			12-65	214.3	0.81			Σ 2510		
1911-55	93.8	3.65	WB	12-73	212.6	0.95		1913-68	182.6	8.70	HF
11-56	96.7	4.12		11-72	214.6	0.95	HF		β 1129		
11-58	95.2	3.51		12-76	215.5	0.89		1911-78	331.6	0.31	B
12-54	93.3	4.17		11-68	212.3	1.14	SC	12-77	328.0	0.36	
	A. 704				$O\Sigma$ 37I			13-75	343.0	0.32	
1910-82	282.2	1.13	HF	1910-66	152.7	0.74	L	13-79	320.5	0.42	
	Ho. 443			10-49	153.6	0.76	WB	15-69	331.8	0.31	
1911-72	115.1	2.74	HF	10-55	152.2	0.80			Espin 80		
	A. 590			12-74	158.1	0.84		1910-81	189.1	3.71	WB
1913-89	131.1	0.77	HF	12-83	158.9	0.75		11-62	190.2	3.39	
					Ho. 447			11-67	188.7	3.33	
				1910-49	174.8	2.03	WB	12-76	185.6	3.57	
					Σ 249I			12-76	190.2	3.49	
				1910-55	218.0	1.08	WB	11-65	191.8	4.25	SC
				10-67	208.6	0.86					

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
Σ 2513				Σ 2524				Σ 2540			
1910-74	320.1	1.80	WB	1910-55	95.7	6.49	WB	1910-61	145.0	5.11	WB
11-55	316.5	2.01		10-61	94.5	6.22		10-72	148.6	5.04	
11-56	318.7	1.96		10-62	93.8	6.21		13-76	147.5	5.04	
13-64	317.0	2.13		12-76	98.3	6.57		13-79	148.4	5.22	
14-69	318.4	2.03		13-61	95.4	7.26		14-61	146.8	4.99	
Σ 3111				Σ 2527				$O\Sigma$ 375			
1910-49	116.7	2.15	WB	A-C				1910-55	151.2	0.60	WB
10-63	115.4	2.33		1910-61	19.9	4.31	SE	10-63	153.2	0.52	
11-54	114.8	2.26		10-61	20.8	4.31	HF	11-54	142.8	0.78	
11-55	116.5	2.33		11-72	20.3	4.30	HF	11-58	152.3	0.52	
12-49	117.4	2.44		β 424				11-59	148.7	0.48	
12-54	115.8	2.49		1910-81	36.2	2.71	WB	12-56	148.8	0.61	
Σ 2518				Hu. 340				12-59	150.5	0.76	
1913-73	355.8	5.26	WB	1911-72	123.7	0.86	HF	12-65	151.8	0.59	
13-73	354.2	5.36		Hu. 1194				12-73	154.8	0.46	
14-61	356.2	5.56		1913-89	41.0	0.86	HF	13-64	155.0	0.71	
14-68	354.1	5.10		A. 160				13-73	152.0	0.68	
14-73	358.3	5.40		1910-49	49.1	0.38	WB	13-80	147.8	0.60	
Σ 2520				A. G. 231				13-81	153.0	0.60	
1910-49	234.5	1.65	WB	1911-72	240.6	4.26	HF	14-65	152.2	0.65	
10-55	235.9	1.63		β 143				14-67	149.8	0.54	
11-54	234.0	1.92		1911-79	191.1	1.98	WB	14-69	152.8	0.59	
11-55	236.4	1.65		11-80	191.5	2.17		14-72	155.8	(0.97)	
13-64	236.0	1.53		12-77	191.2	2.12		β 53			
13-73	234.6	1.65		12-83	191.4	2.20		1913-75	250.5	1.28	HF
14-61	232.9	1.71		Σ 2525				A. 368			
14-67	231.8	1.86		1910-61	311.5	0.86	SE	1914-75	154.8	0.51	WB
13-68	232.1	1.88	HF	10-62	307.1	0.87		A. G. 234			
13-75	228.5	1.70		10-49	306.2	0.63	WB	1912-76	324.6	2.50	WB
14-78	228.9	1.94		10-55	303.8	0.66		12-83	327.4	2.47	
Σ 2525				Ho. 110				Σ 2556			
1910-61	311.5	0.86	SE	1910-49	78.1	2.31	WB	1911-58	130.0	0.33	B
10-62	307.1	0.87		10-63	79.6	2.42		11-78	127.6	0.39	
10-49	306.2	0.63	WB	11-62	76.7	2.44		12-74	128.1	0.45	
10-55	303.8	0.66		11-74	78.8	2.62		12-77	125.5	0.45	
10-62	300.4	0.68		11-72	78.1	2.41	HF	13-79	131.9	0.36	
11-54	303.1	0.63		Ho. 450				15-69	124.3	0.34	
11-56	305.5	0.81		A-B				10-72	128.8	0.37	WB
11-58	304.8	0.80		1911-68	264.1	0.93	SC	10-72	141.9	0.29	
12-42	306.1	0.55		11-79	265.4	0.97	WB	10-74	128.7	0.28	
12-56	301.2	0.71		11-80	273.1	0.91		11-59	129.2	0.28	
12-59	307.6	0.81		12-76	276.6	1.04		11-67	125.6	0.34	
13-64	307.7	0.77		12-77	266.6	0.80		12-59	126.6	0.47	
13-73	306.0	0.90		12-83	284.6	0.85		12-73	141.6	0.41	
13-76	308.8	0.72		Σ 2536				12-76	136.7	0.34	
13-79	308.5	0.71		1910-62	76.9	1.79	L	14-75	118.6	0.37	
13-79	308.0	0.86		13-64	77.1	1.58	WB	12-76	134.9	0.53	HF
14-65	305.3	0.91		A. 713				Σ 2556			
14-67	306.4	0.83		1911-79	215.8	0.28	WB	1911-58	130.0	0.33	B
14-71	303.3	0.97		Ho. 450				11-78	127.6	0.39	
14-73	304.5	0.98		A-B				12-74	128.1	0.45	
15-69	297.5	0.90	B	Σ 2536				12-77	125.5	0.45	
19-62	302.1	0.89		1910-62	76.9	1.79	L	13-79	131.9	0.36	
12-76	307.9	0.66	HF	13-64	77.1	1.58	WB	15-69	124.3	0.34	
13-82	306.2	0.80		A. 713				10-72	128.8	0.37	WB
Σ 2525				A. G. 231				10-72	141.9	0.29	
1910-61	311.5	0.86	SE	1911-72	240.6	4.26	HF	10-74	128.7	0.28	
10-62	307.1	0.87		β 143				11-59	129.2	0.28	
10-49	306.2	0.63	WB	1911-79	191.1	1.98	WB	11-67	125.6	0.34	
10-55	303.8	0.66		11-80	191.5	2.17		12-59	126.6	0.47	
10-62	300.4	0.68		12-77	191.2	2.12		12-73	141.6	0.41	
11-54	303.1	0.63		12-83	191.4	2.20		12-76	136.7	0.34	
11-56	305.5	0.81		Σ 2536				14-75	118.6	0.37	
11-58	304.8	0.80		1910-62	76.9	1.79	L	12-76	134.9	0.53	HF
12-42	306.1	0.55		13-64	77.1	1.58	WB	Σ 2556			
12-56	301.2	0.71		A. 713				1911-58	130.0	0.33	B
12-59	307.6	0.81		1911-79	215.8	0.28	WB	11-78	127.6	0.39	
13-64	307.7	0.77		Ho. 450				12-74	128.1	0.45	
13-73	306.0	0.90		A-B				12-77	125.5	0.45	
13-76	308.8	0.72		1910-62	76.9	1.79	L	13-79	131.9	0.36	
13-79	308.5	0.71		13-64	77.1	1.58	WB	15-69	124.3	0.34	
13-79	308.0	0.86		Σ 2536				10-72	128.8	0.37	WB
14-65	305.3	0.91		1910-62	76.9	1.79	L	10-72	141.9	0.29	
14-67	306.4	0.83		13-64	77.1	1.58	WB	10-74	128.7	0.28	
14-71	303.3	0.97		A. 713				11-59	129.2	0.28	
14-73	304.5	0.98		1911-79	215.8	0.28	WB	11-67	125.6	0.34	
15-69	297.5	0.90	B	Ho. 450				12-59	126.6	0.47	
19-62	302.1	0.89		A-B				12-73	141.6	0.41	
12-76	307.9	0.66	HF	1910-62	76.9	1.79	L	12-76	136.7	0.34	
13-82	306.2	0.80		13-64	77.1	1.58	WB	14-75	118.6	0.37	
Σ 2525				A. G. 231				Σ 2556			
1910-61	311.5	0.86	SE	1911-72	240.6	4.26	HF	1911-58	130.0	0.33	B
10-62	307.1	0.87		β 143				11-78	127.6	0.39	
10-49	306.2	0.63	WB	1911-79	191.1	1.98	WB	12-74	128.1	0.45	
10-55	303.8	0.66		11-80	191.5	2.17		12-77	125.5	0.45	
10-62	300.4	0.68		12-77	191.2	2.12		13-79	131.9	0.36	
11-54	303.1	0.63		12-83	191.4	2.20		15-69	124.3	0.34	
11-56	305.5	0.81		Σ 2536				10-72	128.8	0.37	WB
11-58	304.8	0.80		1910-62	76.9	1.79	L	10-72	141.9	0.29	
12-42	306.1	0.55		13-64	77.1	1.58	WB	10-74	128.7	0.28	
12-56	301.2	0.71		A. 713				11-59	129.2	0.28	
12-59	307.6	0.81		1911-79	215.8	0.28	WB	11-67	125.6	0.34	
13-64	307.7	0.77		Ho. 450				12-59	126.6	0.47	
13-73	306.0	0.90		A-B				12-73	141.6	0.41	
13-76	308.8	0.72		1910-62	76.9	1.79	L	12-76	136.7	0.34	
13-79	308.5	0.71		13-64	77.1	1.58	WB	14-75	118.6	0.37	
13-79	308.0	0.86		Σ 2536				12-76	134.9	0.53	HF
14-65	305.3	0.91		1910-62	76.9	1.79	L	Σ 2556			
14-67	306.4	0.83		13-64	77.1	1.58	WB	1911-58	130.0	0.33	B
14-71	303.3	0.97		A. 713				11-78	127.6	0.39	
14-73	304.5	0.98		1911-79	215.8	0.28	WB	12-74	128.1	0.45	
15-69	297.5	0.90	B	Ho. 450				12-77	125.5	0.45	
19-62	302.1	0.89		A-B				13-79	131.9	0.36	
12-76	307.9	0.66	HF	1910-62	76.9	1.79	L	15-69	124.3	0.34	
13-82	306.2	0.80		13-64	77.1	1.58	WB	10-72	128.8	0.37	WB
Σ 2525				A. G. 231				Σ 2556			
1910-61	311.5										

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
A. 166				Σ 2576				β 978			
1912.76	239.7	0.62	HF	1910.67	288.0	1.91	WB	1911.72	232.4	1.04	HF
13.82	233.7	0.83		10.72	285.6	2.20		11.51	236.0	1.10	SE
O Σ 382				11.79	284.8	2.06		11.55	238.6	1.11	
1911.78	352.3	0.42	B	11.80	285.7	2.07		11.62	242.4	0.93	WB
12.74	337.6	0.34		12.76	285.8	2.00		11.66	242.7	0.87	
12.77	353.3	0.41		12.77	286.8	1.95		11.67	235.7	0.81	
Howe 50				13.73	283.4	2.15		12.49	231.1	0.88	
1910.73	194.7	2.40	HF	13.76	285.8	2.00		12.59	234.7	0.94	
O Σ 380				10.79	283.5	2.43	HF	O Σ 388			
1911.62	74.4	0.46	WB	13.89	285.0	2.07		A-B			
11.74	77.9	0.43		11.77	284.5	2.29	SC	1911.72	138.8	3.40	HF
12.56	74.4	0.35		Hu. 758				11.77	136.5	3.69	SC
12.59	75.0	0.48		1910.79	144.8	1.03	HF	12.76	140.8	3.60	WB
12.65	77.3	0.53		Dawes 10				12.83	144.3	3.46	
12.73	71.3	0.43		1910.77	298.8	0.53	L	Ho. 580			
11.78	77.2	0.45	B	Doo II				1910.77	273.8	0.85	L
12.74	71.0	0.52		1910.77	280.3	2.50	L	Σ 2596			
12.77	80.9	0.51		Σ 2584				1913.68	325.5	1.89	HF
11.51	82.1	0.54	SE	1910.77	292.8	1.80	L	13.75	322.8	2.23	
12.76	73.4	0.54	HF	Σ 2583				10.74	327.2	1.83	WB
Lewis 30				1912.76	115.6	1.40	HF	10.75	320.3	1.91	
1910.61	347.4	3.68	SE	13.68	114.0	1.27		10.76	323.9	1.76	
10.62	348.5	3.46		11.59	114.1	1.41	WB	11.62	323.9	1.90	
Σ 2574				11.59	114.8	1.48		11.66	323.0	1.82	
1913.48	165.1	0.27	B	12.49	113.7	1.30		11.67	324.7	1.98	
β 657				12.56	114.8	1.21		12.49	328.3	1.97	
1910.73	149.9	1.05	HF	13.73	113.7	1.36		12.56	329.5	1.80	
β 658				13.73	116.1	1.48		13.53	323.8	1.82	
1911.78	289.0	0.46	B	14.65	112.3	1.33		13.64	323.9	2.00	
A.G.C. 10				14.67	113.8	1.50		13.73	329.2	1.84	
1913.79	134.3	0.23	B	Σ 2586				14.65	323.9	1.83	
Σ 2569				1910.77	225.0	3.82	L	14.68	325.1	1.93	
1910.73	2.2	2.16	HF	A.G.C. II				Σ 2600			
11.72	1.5	2.38		1913.48	188.6	0.21	B	1910.77	56.0	2.97	L
12.76	2.6	2.25		13.73	170.7	0.25		Ho. 581			
Σ 2577				13.75	166.9	0.13		1911.78	122.1	0.28	B
1911.64	264.1	6.03	SC	13.79	160.6	0.23		β 831			
11.72	261.3	5.73	HF	15.65	163.4	0.18		1913.89	129.6	0.82	HF
13.68	263.8	6.18		O Σ 387				β 425			
13.75	263.3	6.15		1910.72	326.4	0.45	WB	A-B			
13.82	262.5	5.79		10.72	324.6	0.46		1910.51	242.0	1.31	WB
Dawes 13				10.75	318.5	0.48		10.61	240.8	1.27	
1911.79	268.0	1.84	WB	11.79	319.6	0.40		11.59	239.9	1.33	
11.80	267.0	1.88		11.80	316.2	0.49		11.59	240.1	1.44	
A.G. 237				12.76	320.9	0.63		β 981			
1910.79	144.4	2.26	HF	12.77	322.5	0.53		1910.73	115.1	3.10	HF
Σ 2579				12.77	322.5	0.53		O Σ 392			
1913.75	277.3	1.57	B	13.76	314.9	0.39		A-B			
13.79	286.9	1.74		13.79	310.7	0.46		1913.79	274.8	0.16	WB
14.52	273.8	1.59		13.79	316.0	0.51		13.80	282.5	0.26	
13.89	285.8	1.36	HF	13.80	314.1	0.59		A-C= Σ 2607			
Σ 2578				14.74	317.0	0.62		1913.79	290.1	2.96	WB
1911.77	157.1	9.83	SC	14.75	314.6	0.54		13.80	291.4	3.10	
β 361				Σ 2588				Σ 2588			
1911.72	351.1	3.74	HF	1911.77	157.1	9.83	SC	1913.79	274.8	0.16	WB

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
$\text{O}\Sigma 395$				$\Sigma 2657 R$				$\Sigma 2672$			
1913.53	105.6	0.76	WB	1911.68	36.0	10.93	SC	1910.75	297.7	0.85	WB
13.64	101.4	0.60		13.89	34.1	10.55	HF	10.80	300.9	0.82	
13.65	98.1	0.63		$\Sigma 2653$				11.54	298.7	0.94	
13.66	105.3	0.54		1910.75	266.1	2.44	WB	11.55	293.3	0.87	
14.65	104.2	0.86		10.76	267.0	2.61		11.55	293.0	0.97	
14.67	103.5	0.76		11.54	262.3	2.35		12.56	292.0	0.82	
14.69	105.3	0.77		11.55	264.4	2.45		12.73	301.9	0.77	
14.72	103.9	0.78		12.73	264.2	2.56		12.76	302.1	0.86	
11.58	109.6	0.63	B	$\text{O}\Sigma 403$				$\beta 432$			
11.61	105.2	0.62		1911.68	171.6	0.91	SC	1913.65	191.4	0.94	WB
11.78	104.0	0.58		13.89	171.8	0.82	HF	13.73	193.2	1.03	
12.74	103.0	0.62		14.73	169.9	0.87	B	14.75	195.0	1.54	
12.77	105.8	0.68		$\text{Espin } 27$				11.65	199.2	1.41	SC
13.79	101.7	0.62		1912.76	338.7	3.68	WB	$\text{De. } 22$			
14.73	106.0	0.62		12.83	338.9	3.86		1910.72	144.2	2.74	WB
15.69	102.5	0.69		$\beta 983$				10.72	141.5	2.64	
13.68	105.5	0.66	HF	1910.74	151.4	1.03	WB	12.76	147.8	2.54	
13.75	105.7	0.53		10.75	154.8	0.87		12.77	144.0	2.75	
13.85	106.2	0.61		10.80	150.3	0.84		$\text{A. } 393$			
$\text{A. } 1194$				$\beta 984$				$\beta 62$			
1910.55	304.4	0.75	WB	1910.75	213.0	0.64	WB	1910.78	135.4	1.02	WB
10.63	308.5	0.78		10.80	215.4	0.69		10.81	133.8	1.22	
11.59	299.8	0.86		11.54	217.1	0.73		13.65	132.7	1.12	
11.59	304.2	0.75		11.55	214.0	0.88		13.73	132.7	1.47	
11.62	298.3	0.71		12.49	214.9	0.74		13.76	133.0	0.72	
13.53	304.7	0.73		12.56	217.7	0.72		13.79	137.5	1.06	
14.73	305.7	0.83		13.65	215.2	0.80		14.73	133.3	1.12	
$\text{A. } 380$				13.73	210.5	0.79		14.75	133.5	1.44	
1913.82	199.3	0.89	HF	14.65	217.8	0.69		13.82	135.6	0.98	HF
$\beta 57$				14.69	216.8	0.83		Dawes I			
1910.74	116.8	2.07	WB	14.72	218.6	1.04		$\text{B-C} = \text{O}\Sigma 407$			
$\beta 428$				14.73	218.8	0.81		1911.68	214.8	1.00	SC
1910.55	354.9	0.68	WB	13.68	213.0	0.74	HF	$\text{A-B} = \Sigma 2690$			
10.63	354.6	0.66		13.75	214.0	0.65		1911.80	256.9	15.90	SC
11.59	351.0	0.69		13.82	212.3	0.84		$\Sigma 2695$			
11.59	349.4	0.92		$\text{A. } 391$				1910.55	80.6	1.13	WB
11.66	352.6	0.67		1913.75	277.5	0.74	HF	10.61	77.0	1.02	
11.51	355.5	0.78	SE	$\beta 431$				10.63	77.6	1.10	
$\text{O}\Sigma 398$				1910.75	33.4	0.49	WB	11.54	77.2	1.08	
1910.72	87.1	0.99	WB	10.84	35.7	0.52		11.55	76.9	1.08	
10.75	80.7	0.97		13.65	40.7	0.70		12.56	79.3	0.96	
10.84	81.2	0.96		13.79	36.6	0.41		12.59	75.4	0.96	
$\text{O}\Sigma 400$				13.79	36.2	0.49		12.73	76.6	1.16	
1913.89	345.4	0.45	HF	14.74	36.5	0.42		13.35	80.0	0.84	
$\Sigma 2652$				14.75	35.3	0.64		13.64	81.4	1.20	
1914.73	254.1	0.33	B	13.89	38.9	0.66	HF	13.66	78.1	1.01	
$\Sigma 2644$				$\beta 1259$				14.69	75.2	1.12	
1911.65	209.7	3.52	SC	1910.75	168.9	0.49	WB	14.71	83.2	0.90	
$\text{Doo } 14$				13.65	162.5	0.51		14.72	76.5	1.16	
1910.73	263.7	1.73	HF	13.79	167.8	0.33		12.58	78.4	0.98	SC
$\text{A. } 1202$				13.79	166.0	0.29		10.61	82.7	1.07	SE
1910.74	126.2	0.75	WB	13.80	168.4	0.30		10.62	79.5	1.10	
$\Sigma 2652$				14.73	168.3	0.76		11.76	81.8	0.98	HF
$\Sigma 2644$				14.74	167.8	0.54		13.68	84.5	1.00	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
O Σ 417				Σ 2749—continued.				Hu. 767			
1910-75	27-8	0-55	WB	B-C				1911-78	148-3	0-24	B
10-80	27-2	0-54		1911-81	158-7	0-92	B	12-74	126-4	0-23	
11-74	27-8	0-61		A. 178				12-77	124-5	0-27	
11-80	25-4	0-68		1910-75	77-6	0-82	WB	12-87	156-5	0-22	
12-56	32-7	0-65		11-55	75-4	0-87		13-48	180-3	0-14	
12-73	25-8	0-66		11-55	77-4	0-74		O Σ 432			
12-76	29-5	0-72		11-82	69-5	1-07	HF	1911-79	124-1	1-20	WB
12-76	25-5	0-63		O Σ 527				11-80	124-7	1-24	
11-76	29-2	0-78	HF	1913-75	266-9	0-25	B	12-77	123-6	1-24	
β 367				O Σ 430				12-83	125-9	1-34	
1913-79	182-1	0-13	WB	1910-81	199-6	1-16	WB	13-79	125-1	1-28	
13-79	189-7	0-14		11-55	202-4	1-37		13-79	123-6	1-30	
13-80	190-4	0-22		11-55	205-7	1-44		13-84	124-4	1-37	
14-73	177-3	0-24		12-83	199-9	1-39		11-68	125-4	1-54	SC
14-74	157-5	0-21		13-79	203-4	1-21		11-80	125-7	1-45	
11-81	164-9	0-24	B	13-80	201-4	1-33		12-83	126-0	1-20	
O Σ 418				14-69	205-4	1-47		β 1261			
1910-75	290-5	1-07	WB	14-70	206-4	1-42		1911-55	145-2	1-36	WB
10-80	290-9	1-16		13-68	207-3	1-39	HF	11-59	152-9	1-20	
11-74	290-3	1-24		13-75	208-6	1-43		11-62	150-4	1-46	
11-80	290-7	1-09		13-85	202-7	1-30		11-82	146-8	1-68	HF
12-76	286-6	1-16		Ho. 152				1911-79	244-4	1-13	WB
12-77	289-7	1-12		1910-75	329-9	0-51	WB	12-76	246-1	1-28	
11-55	288-3	1-18	SE	10-80	331-0	0-37		12-83	249-2	1-09	
11-76	288-9	1-17	HF	10-81	336-3	0-41		13-79	244-4	1-25	
11-65	292-7	1-25	SC	11-58	330-3	0-46		13-79	244-6	1-23	
12-58	292-6	1-37		11-59	330-4	0-33		14-84	247-6	1-30	
Hu. 363				11-62	313-0	0-45		Ho. 153			
1910-74	100-6	0-65	WB	11-63	329-2	0-38		1910-81	121-7	0-80	WB
11-63	95-0	0-54		12-76	323-1	0-46		11-79	120-9	0-99	
Σ 2737				β 681				12-83	125-9	0-78	
A-B				1913-68	238-6	2-34	HF	Ho. 286			
1910-64	278-0	0-28	B	O Σ 535				1911-78	316-9	0-27	B
11-78	269-1	0-41		1910-77	19-3	0-22	L	11-81	311-8	0-17	
11-81	280-4	0-29		10-64	12-0	0-23	B	12-87	6-8	0-18	
12-74	277-8	0-30		11-78	6-6	0-16		13-49	4-8	0-14	
12-77	285-9	0-28		11-81	9-2	0-14		13-73	18-9	0-16	
13-48	284-2	0-30		12-74	250-9	0-13		13-75	13-8	0-15	
13-75	273-8	0-20		12-77	256-2	0-13		13-79	300 \pm	..	
13-79	277-7	0-33		12-87	247-9	0-17		13-81	317-1	0-18	
15-82	229-9	0-21		13-48	194-6	0-17		13-96	291-5	0-11	
A-C				13-65	200-1	0-14		14-52	291-1	0-16	
1914-88	72-5	10-86	HJ	13-73	56-0	0-22		15-82	88-4	0-20	
A. 176				13-79	247-1	0-21		13-79	333 \pm	<0-1	WB
1911-59	134-0	0-32	WB	14-52	36-8	0-26		O Σ 437			
β 69				14-73	28-8	0-23		1910-81	40-3	1-77	WB
1910-66	314-9	0-89	WB	15-65	19-4	0-24		10-84	39-7	1-71	
10-74	314-1	0-90		15-82	23-5	0-35		10-85	39-8	1-75	
11-55	311-3	0-79		10-74	17-5	0-27	WB	11-74	39-6	1-83	
11-58	314-1	0-94		10-74	17-9	0-21		11-79	37-8	1-80	
12-56	311-8	0-85		10-85	15-3	0-21		12-83	41-4	1-80	
12-59	312-9	0-84		11-58	5-7	0-18		13-79	39-1	1-82	
11-82	312-3	1-04	HF	11-63	359-6	0-23		13-79	37-4	1-75	
12-76	316-4	0-81		11-66	355-6	0-21		14-84	37-6	1-80	
Σ 2749				13-81	68-1	0-14		11-68	37-4	2-08	SC
A-B				14-73	22-4	0-27		11-80	43-2	1-94	
1911-81	158-9	2-40	B	14-84	22-3	0-29		12-58	38-7	1-98	
								12-83	39-4	1-93	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
	β 838				Hu. 371— <i>continued.</i>				Ho. 166		
1911·81	104·9	1·66	B	1911·66	159·2	0·24	WB	1911·59	62·2	0·33	
11·74	109·4	1·51	WB	11·73	161·4	0·14		11·65	62·8	0·28	WB
	A. 295			13·79	180·1	0·15		11·66	69·3	0·30	
1910·75	236·3	0·37	WB	13·80	175·4	0·14		13·79	65·9	0·16	
10·80	227·1	0·35		14·73	170·2	0·25		13·81	63·6	0·21	
10·81	235·2	0·38		14·84	190·7	0·28			Σ 2822		
11·58	223·5	0·42							A-B		
11·73	240·5	0·29			Hu. 372			1910·81	129·2	1·80	WB
13·79	229·5	0·24		1910·74	139·6	0·19	WB	10·85	126·3	1·84	
13·80	229·3	0·37						11·62	126·9	1·78	
14·73	223·8	0·34			β 1212			11·65	126·7	1·68	
14·73	238·5	0·34		1910·64	278·1	0·45	B	12·83	126·7	1·56	
14·74	237·3	0·42		11·78	278·9	0·46		13·81	129·2	1·57	
14·84	231·4	0·41		11·81	286·0	0·42		14·72	128·9	1·78	
13·75	229·4	0·54	HF	12·74	290·8	0·51		14·79	129·4	1·53	
	A. 617			12·87	285·5	0·55		14·84	129·4	1·66	
1910·64	266·1	0·17	B	13·48	292·9	0·45		14·88	136·2	1·75	HJ
11·78	285·0	0·27		13·75	285·1	0·44		11·80	131·3	2·15	SC
11·81	285·0	0·17		13·79	299·3	0·48		12·58	131·6	1·95	
12·74	286·3	0·19		14·73	293·0	0·48		12·83	130·0	2·01	
12·87	270·2	0·19		15·82	303·0	0·34			A-C		
	Σ 2791			14·88	290·5	0·53	HJ	1914·88	262·4	43·38	HJ
1910·66	101·4	2·42	WB		$\frac{AB}{2} - C$				β 989		
10·74	103·6	2·35		1914·88	148·0	42·07	HJ		A-B		
11·62	102·1	2·31						1910·77	288·8	0·21	L
11·66	102·5	2·41			$\text{O}\Sigma$ 448			10·87	289·3	0·19	
11·74	101·5	2·25		1910·66	221·8	0·61	WB	10·64	273·0	0·13	B
14·69	106·1	2·59		10·80	232·1	0·72		11·78	279·3	0·25	
	β 164			10·81	227·9	0·61		11·81	287·7	0·20	
1911·58	233·4	0·52	WB	11·74	230·1	0·66		12·74	243·6	0·26	
11·59	241·2	0·48		11·79	224·6	0·78		12·77	241·2	0·21	
11·62	240·9	0·46		11·83	225·9	0·83		12·87	270·2	0·14	
12·59	234·4	0·47		12·56	235·6	0·69		13·48	214·7	0·13	
	Σ 2799			12·76	230·3	0·63		13·73	198·6	0·23	
1911·82	290·5	1·42	HF	12·83	225·4	0·83		13·79	232·5	0·16	
10·61	289·6	1·28	WB	13·79	230·7	0·52		13·81	195·9	0·27	
10·63	293·6	1·48		13·81	226·8	0·53		14·73	171·7	0·15	
11·55	290·1	1·40		14·69	230·3	0·81		15·65	129·2	0·12	
11·59	293·6	1·50		14·70	234·7	0·80		15·82	133·7	0·17	
14·69	291·9	1·44		14·73	227·7	0·90		10·74	284·9	0·16	WB
14·70	290·5	1·53		13·75	220·1	0·66	HF	10·75	283·3	0·16	
	Hn. 45							11·58	280·0	0·24	
1910·81	18·6	1·04	WB		Ho. 164			11·63	280·4	0·24	
10·88	18·1	1·34		1910·81	62·8	3·14	WB	11·66	269·0	0·24	
11·79	19·9	1·42		10·90	63·0	3·03		12·56	249·4	0·20	
11·93	15·6	1·02		10·91	62·9	3·38		12·59	228·4	0·19	
12·83	11·7	1·35		11·93	64·0	3·27		13·79	225·4	0·11	
	Hu. 371			12·83	65·4	3·60		13·79	194·3	0·14	
1910·64	168·3	0·17	B		β 274			13·81	194·3	0·18	
11·78	156·6	0·16		1911·93	180·7	3·15	WB	13·81	195·1	0·25	
11·81	159·0	0·25						14·73	154·9	0·25	
12·77	163·5	0·22			Ho. 165			14·74	147·8	0·25	
12·87	155·3	0·22		1910·63	59·8	0·38	WB		A-C= Σ 2824		
13·48	184·5	0·17		11·58	65·5	0·47		1910·87	297·5	12·81	L
11·59	149·8	0·15	WB	11·59	64·9	0·43		10·74	297·2	12·59	WB
11·63	160·6	0·18			β 688			13·80	298·9	12·92	
				1913·79	190·2	0·20	WB		A.G. 276		
								1910·61	355·4	1·62	WB
								10·63	358·6	2·09	
								10·66	355·9	1·66	
								11·55	357·3	1·83	
								11·59	355·7	1·88	
								10·61	356·0	2·34	SE
								10·62	358·7	2·21	

Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.	Date.	Angle.	Dist.	Obs.
A.G. 277				Σ 288I				Hu. 385			
1910-85	239.4	2.38	WB	1910-80	98.2	1.50	WB	1910-77	72.7	1.44	L
10-88	235.0	2.18		10-85	101.0	1.57					
11-74	235.4	2.32		11-93	103.8	1.37		South 345			
11-83	233.4	2.30		12-56	99.5	1.31		1911-83	308.0	6.20	WB
10-61	236.4	2.58	SE	12-83	102.2	1.70					
10-62	237.3	2.50		12-97	98.8	1.59		Hu. 596			
Ho. 171				10-61	97.5	1.73	SE	1910-77	13.2	1.33	L
1910-63	171.8	0.64	WB	10-62	99.0	1.61					
10-80	170.8	0.82		11-65	99.4	1.72	SC	β 291			
11-59	173.7	0.70		11-93	99.8	2.00		1910-64	182.2	0.36	B
11-65	172.8	0.71		12-58	99.2	1.77		11-81	167.4	0.33	
12-76	170.9	0.81		12-86	89.3	1.69	HF	β 701			
11-80	179.1	0.81	SC	A.G. 281				1910-77	274.3	1.15	L
β 75				1911-59	22.4	2.15	WB				
1910-63	52.1	1.09	WB	11-62	20.2	2.47		β 1218			
11-59	44.7	0.80		11-65	21.6	2.45		1910-80	54.3	1.28	WB
11-62	49.5	0.76		11-66	20.4	2.47		10-90	55.3	1.26	
14-69	46.1	0.89		12-86	21.5	2.53		10-63	58.5	1.66	SE
14-70	52.6	1.06		Ho. 180				10-75	56.6	1.46	
11-78	43.6	1.11	B	1911-93	231.1	0.71	SC	11-93	54.4	1.79	SC
11-81	45.5	1.03		Hu. 383				Σ 2909			
11-83	36.5	0.84		1910-74	42.2	0.18	WB	1911-93	309.8	3.05	SC
14-73	46.7	0.93		β 1216				12-80	309.9	2.53	WB
ΟΣ 452				1910-64	300.5	0.51	B	Σ 2912			
1910-63	178.9	1.17	WB	11-78	304.0	0.65		1910-64	118.0	0.35	B
11-62	170.8	0.98		11-81	302.2	0.57		11-81	112.3	0.31	
11-63	174.5	0.79		10-62	302.3	0.65	SE	13-79	122.0	0.29	
11-73	177.2	0.97		10-87	306.0	0.62		Hu. 388			
A.G. 278				11-93	309.5	0.80	SC	1910-74	142.0	0.19	WB
1910-81	156.5	3.17	WB	Σ 2895				Ho. 475			
10-90	159.4	3.13		1910-74	37.0	8.23	WB	A-B			
11-93	157.4	3.20		Σ 2900				1910-80	319.8	0.79	WB
Σ 2849				1910-77	179.3	1.44	L	10-83	315.9	0.81	
1911-83	259.9	1.37	WB	10-85	181.3	1.61		11-59	316.3	0.85	
14-69	259.6	1.43		10-62	176.9	1.48	SE	11-66	314.4	0.76	
14-70	259.8	1.46		10-85	181.9	1.46		12-79	316.4	0.85	
β 696				10-66	169.0	0.97	WB	12-97	312.4	0.90	
1910-64	359.0	0.46	B	10-74	173.1	0.93		10-90	319.1	0.92	L
11-78	341.6	0.38		11-59	175.1	1.61		A-C			
11-81	357.2	0.47		11-65	173.3	1.10		1910-80	223.9	8.15	WB
13-79	356.4	0.45		11-66	175.8	1.32		10-83	225.0	7.97	
14-73	1.7	0.57		12-79	174.8	1.42		11-59	222.6	8.54	
12-56	359.0	0.57	WB	12-80	168.7	1.17		11-66	222.3	8.13	
ΟΣ 462				12-97	177.0	1.20		12-97	226.8	8.36	
1910-81	323.1	1.22	WB	13-85	179.0	1.47		10-90	224.6	7.74	L
A. 308				14-69	174.0	1.33		Ho. 186			
1910-64	116.3	0.23	B	14-70	177.2	1.39		1910-91	24.1	7.67	L
β 842				14-81	178.7	1.25	HF	Σ 2925			
1910-74	122.6	0.92	WB	Hu. 493				1910-74	3.6	7.55	WB
14-70	120.2	1.38		1910-85	168.0	0.68	L	14-73	1.5	7.44	
ΟΣ 464				β 172				14-81	6.5	7.44	HF
1911-80	66.6	0.72	SC	1910-64	358.6	0.66	B	Ho. 480			
Hu. 978				11-78	355.1	0.75		1910-80	220.2	0.77	WB
1910-74	222.6	0.69	WB	11-81	346.1	0.75					
14-69	221.3	0.78		12-74	357.5	0.61					
				13-73	359.5	0.60					
				13-79	359.1	0.70					
				14-73	357.9	0.78					
				15-82	2.5	0.84					

CATALOGUE OF
DOUBLE STARS

FROM OBSERVATIONS MADE WITH

THE 28-INCH REFRACTOR

AT THE

ROYAL OBSERVATORY, GREENWICH.

1893-1919.

THE observations from 1894 onwards were all made with the 28-inch refractor. During 1893 a comparatively small number of observations were made, all except three with the 12 $\frac{3}{4}$ -inch Merz refractor. The eyepiece generally employed was VI., which gave a power of 670. Although more than a dozen observers actually assisted in the work, the great bulk of the observations were made by Mr T. Lewis (1893-1911), Mr W. W. Bryant (1897-1903 and 1906-1919), Mr W. Bowyer (1895-1914), and Mr H. H. Furner (1902-1919).

No correction for personality was applied to the position angle. The distance measures of Mr Lewis, Mr Bryant and Mr Bowyer were found to be sensibly equal. Small corrections to the measures of distance made by other observers were applied. These are given in the introduction. In forming the means for this catalogue, observations by different observers were given equal weight. Only in rare cases have observations made ten years apart been combined. In general, the groups do not extend over six years.

The separate observations made up to 1909, inclusive, have been published in the annual volumes. Later observations are given in an earlier part of this volume. Observations made by Mr R. Jonckheere, Director of the Observatory of the University of Lille, during the period 1914-1918 have not been included in the means. In a few cases his measures are given for comparison, and then a footnote is given indicating the source of the observations.

The first column gives the number of the star in Burnham's *General Catalogue of Double Stars*, and the second column gives the common name. The third and fourth columns give the Right Ascension and Declination for 1925.0. The magnitudes, taken from Burnham's *Catalogue*, are given in the next column. The observations are then given. The epoch of the observations is in general given to a tenth of a year only, but in cases of rapid motion the epoch is given to hundredths of a year. The column headed "n" gives the number of nights on which the observations were made. The three final columns give the observations recorded in Part I. of Burnham's *General Catalogue*, and are added for convenience.

An asterisk * before the Burnham number indicates that a note on the relative motion of the components is given later in this volume.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"		°	"	
12,724	Σ 3055	0 0 20	+11 44	7.0, 11.2	1905.0	357.1	5.44	1	1831.1	0.8	5.45
*12,731	Σ 3056	0 0 48	+33 52	7.4, 7.4	1900.8 08.5 13.0	148.9 146.9 145.0	0.55 0.67 0.52	20 4 1	1831.3	158.2	0.55
	AB, C			9.0	1903.8 13.0	358.6 0.1	22.61 23.31	2 1	1831.6	355.4	20.48
*12,732	β 862	0 0 54	+37 45	8.5, 8.8	1901.0 10.5	314.3 130.2	0.58 0.54	1 2	1881.7	104.9	0.54
12,739	Σ 3058	0 1 27	+29 55	7.7, 9.2	1909.0	51.5	12.78	4	1831.0	49.9	12.47
*12,740	OΣ 547	0 1 37	+45 24	8.3, 8.3	1908.0 13.9	136.8 140.3	4.65 4.78	1 1	1876.1	110.9	4.49
12,746	Σ 3061	0 1 52	+17 26	8.0, 8.0	1903.9 13.0	148.4 147.8	7.90 7.48	1 2	1829.8	148.4	7.59
*12,750	Σ 3060	0 2 10	+17 40	8.5, 8.7	1904.9 11.3	120.8 119.7	3.60 3.44	4 9	1830.5	110.5	3.93
*12,755	Σ 3062	0 2 15	+58 2	6.9, 8.0	1895.11 99.75 1913.73	331.2 340.9 12.7	1.58 1.45 1.68	2 5 1	1831.7	87.5	0.82
1	Hu. 401	0 2 18	+23 21	9.1, 9.5	1908.9 13.8	206.7 216.7	0.82 0.78	1 1	1901.8	215.1	0.70
12,756	Hu. 1001	0 2 32	+34 12	8.2, 11.2	1907.0	182.8	1.69	1	1904.5	178.4	1.98
6	Ku. 3	0 3 37	+20 4	9.9, 9.9	1910.9	81.6	0.92	4	1902.0	81.3	1.00
3	β 1155	0 3 44	+ 3 45	8.7, 9.3	1902.9	92.9	0.59	1	1890.8	90.4	0.44
	† Bowyer	0 4 13	+20 4	8.7, 9.7	1910.0	47.8	2.82	4			
41	β 253	0 6 27	+58 6	8.3, 8.5	1901.0 11.1	44.9 51.7	0.49 0.62	3 1	1876.0	49.9	0.42
43	β 485	0 6 48	+58 21	8.7, 9.0	1901.8	304.9	0.41	1	1878.2	328.5	0.41
45	Krueger 1	0 6 58	+57 25	9.2, 9.5	1900.3 11.9	189.9 187.5	1.98 2.18	3 1	1890.8	189.9	1.70
53	Ho. 1	0 7 35	+29 11	8.5, 8.5	1905.0	170.4	1.16	2	1884.4	168.6	1.00
54	Σ 7	0 7 41	+55 33	8.0, 8.5	1911.9	216.0	1.42	1	1831.8	216.6	1.31
61	β 255	0 7 58	+28 0	7.5, 7.8	1897.7 1913.0	97.3 92.1	0.48 0.58	7 2	1875.8	99.0	0.38
62	β 1026	0 8 11	+53 12	8.1, 8.9	1900.9	330.0	0.33	2	1888.8	329.6	0.48
67	β 864	0 9 0	+34 45	8.9, 12.3	1899.9	149.4	2.02	1	1880.8	138.6	1.60
* 70	OΣ 2	0 9 31	+26 34	6.9, 8.3	1899.8 1912.4	37.4 33.9	0.57 0.51	32 6	1851.4	59.9	0.80
	AC			9.6	1898.9 1913.5	225.9 224.6	17.57 18.14	6 4	1851.4	226.2	17.77
74	β 998	0 9 48	+ 6 10	8.7, 8.7	1913.4	112.4	1.06	2	1881.9	114.9	1.04

† B.D. + 19°5.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
86	β 1027	h m s	° ′			°	"			°	"
		0 11 3	+21 8	7.2, 10.3	1900.3 13.0	183.9 183.6	1.47 1.50	5 2	1888.8	186.8	1.54
103	Hu. 405	0 12 42	+24 9	9.3, 9.5	1907.9	275.4	1.13	5	1901.9	272.7	1.13
105	Σ 19	0 12 48	+36 13	7.0, 9.5	1901.9 13.5	134.6 135.3	2.16 1.84	4 2	1837.0	133.1	2.33
109	Ku. 4	0 13 8	+21 22	9.5, 10.1	1905.2 10.8	133.9 131.5	2.27 2.16	5 3	1901.4	135.1	2.45
128	Σ 24	0 14 36	+25 43	7.2, 8.0	1903.9	247.8	4.94	2	1831.1	248.3	5.20
135	Σ 25	0 14 51	+15 35	8.5, 8.5	1904.3 13.6	191.7 185.8	1.38 1.38	2 3	1831.8	192.7	1.67
143	H. 1016	0 16 2	+54 59	10, 11	1914.1	179.2	6.28	1	1828+	182.2	6±
150	β 1015	0 16 46	+11 54	8.4, 8.6	1899.9	120.7	0.46	11	1891.6	120.6	0.52
153	β 1093	0 17 3	+10 34	7.3, 8.2	1899.8 1910.9	54.2 69.3	0.35 0.30	10 6	1889.7	54.3	0.39
157	OΣ 7	0 17 25	+66 3	7.2, 8.0	1901.8	107.4	0.54	1	1847.3	107.2	0.46
167	Espin 42	0 18 58	+54 11	8.3, 9.3	1914.1	194.8	10.73	1	1901.1	191.3	10.36
202	β 1156	0 22 26	+64 1	9.2, 9.3	1901.8	34.5	0.45	1	1890.7	31.9	0.52
208	β 1225	0 23 10	+20 41	8.1, 11.8	1902.9	188.3	1.29	1	1891.9	189.3	1.15
217	β 779	0 23 58	+23 10	8.5, 9.0	1907.4 12.2	256.7 256.6	0.81 0.80	6 3	1881.7	263.3	0.85
12,783	Hu. 1009	0 27 14	+33 1	9.0, 9.6	1908.0	240.8	1.74	2	1904.7	241.5	1.67
* 260	OΣ 12	0 27 36	+54 7	5.6, 5.9	1901.7 13.1	150.6 155.4	0.45 0.46	9 7	1845.8	122.9	0.52
276	β 1310 AC	0 28 42	+22 47	7.3, 12.8	1909.8	295.0	13.91	1	1903.1	301.0	15.25
12,786	Hu. 1010	0 31 15	+33 27	9.2, 9.2	1909.3	85.6	1.39	3	1904.5	85.0	1.28
309	Hu. 61	0 31 17	+14 28	9.5, 11.2	1909.9	226.8	1.55	1	1888.8	225.1	1.61
* 314	Ho. 212	0 31 21	- 4 0	5.5, 6.2	1906.88 07.83 08.90 13.94	244.4 245.0 265.0 241.4	0.24 0.31 0.25 0.22	1 1 1 3	1887.81	93.4	0.3±
317	OΣ 15	0 31 40	+48 37	7.5, 8.5	1901.30 14.56	314.4 314.4	0.16 0.18	3 4	1890.88	301.6	0.15
* 322	Σ 42	0 32 1	+29 36	7.9, 8.7	1909.2	28.0	5.72	4	1832.0	35.3	5.32
327	Hu. 410	0 32 37	+21 37	9.0, 11.0	1908.6	315.8	3.14	3	1901.9	321.0	3.31
336	Hu. 411	0 33 40	+22 16	8.5, 8.5	1907.7 11.9	99.9 101.4	0.64 0.66	5 3	1901.9	98.8	0.67
339	Ho. 305	0 34 6	+24.46	8, 11	1906.4	194.3	5.98	4	1890.0	192.2	5.40
	AC			13	1906.9	21.0	20.30	1			
360	Σ 46	0 36 1	+21 2	5.0, 8.2	1903.9	191.7	6.81	1	1830.3	192.7	6.37

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
359	β- 257	h m s 0 36 5	° ' " +46 51	7.9, 9.0	1902.2	° 235.4	" 0.50	3	1876.0	° 236.6	" 0.48
* 374	OΣ 18	0 38 31	+ 3 46	7.4, 9.5	1901.8 10.9	128.4 147.6	1.07 1.29	1 1	1845.7	93.6	1.40
399	Hn. 3	0 40 55	+53 9	8.5, 8.6	1914.2	55.7	2.94	3	1881.6	54.5	2.65
402	β 865	0 41 20	+43 0	8.5, 9.0	1900.2	195.8	1.33	4	1880.8	197.4	1.21
414	β 866	0 42 11	+43 0	9.2, 9.2	1900.6	71.6	1.56	3	1880.8	68.2	1.26
418	Hu. 413	0 43 3	+22 51	8.0, 9.2	1910.2	245.4	0.76	4	1901.9	242.7	0.83
422	Σ 59	0 43 34	+51 2	7.2, 8.1	1908.1	147.5	2.25	3	1832.3	145.0	2.19
425	Ho. 306	0 44 4	+25 9	8.5, 8.8	1906.8	165.4	1.23	5	1893.8	164.6	1.08
* 426	Σ 60	0 44 25	+57 26	4.0, 7.6	1898.56 1902.45 11.82 14.85	217.2 225.0 243.0 252.2	5.12 5.52 6.52 6.56	2 4 2 2	1836.70	92.1	9.39
* 431	β 495	0 44 46	+18 17	7.5, 7.5	1898.4 1902.8 11.1	220.7 223.1 216.4	0.68 0.57 0.69	10 15 5	1878.7	230.9	0.58
439	Σ 61	0 45 50	+27 18	6.0, 6.0	1908.8	296.1	4.48	1	1832.1	299.0	4.45
* 440	β 232	0 46 10	+50 14	8.0, 8.5	1901.0 11.1 14.1	320.1 46.5 312.9	0.44 0.17 0.09	1 1 1	1876.2	288.4	0.48
446	Ho. 4	0 46 36	+33 33	9, 9	1907.6	200.4	1.57	3	1882.8	202.0	1.48
451	Hu. 414	0 47 39	+23 14	9.0, 12.5	1909.8	117.7	1.90	1	1901.9	118.5	1.53
455	β 1	0 48 23	+56 15	8.1, 10.1	1914.1	86.2	1.48	1	1875.3	81.0	1.42
	AC			8.9	1914.1	138.0	4.03	1	1875.3	133.3	3.70
	AD			9.5	1914.1	192.3	8.71	1	1875.3	192.9	8.82
	AE			12.5	1914.1	333.3	15.77	1	1889.6	333.1	15.84
* 456	Σ 67	0 48 13	+10 12	8.3, 9.0	1907.9 1912.5	1.3 359.9	1.76 1.90	4 9	1830.9	13.0	1.58
477	Hu. 802	0 50 37	+49 0	7.2, 7.8	1912.8	208.6	0.24	3	1902.8	212.3	0.26
* 479	OΣ 20	0 50 37	+18 47	5.9, 7.0	1897.4 1902.3 11.4	329.0 314.1 304.3	0.43 0.44 0.43	11 12 3	1847.3	72.8	0.62
* 482	Σ 73	0 50 56	+23 14	6.2, 6.8	1896.8 1900.6 03.7 07.1 10.5 13.8	14.2 19.0 24.0 28.1 34.0 35.9	1.15 0.93 1.01 0.98 0.82 0.83	12 12 14 12 8 8	1836.9	320.5	0.94
484	Σ 75	0 51 11	+13 9	8.6, 10.6	1911.8	273.0	4.69	1	1831.9	275.3	4.82
* 489	β 1099	0 52 14	+59 58	6.1, 6.8	1902.4 10.1 15.1	323.8 327.9 328.0	0.15 0.17 0.21	4 1 2	1889.6	270.2	0.15

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
498	Ho. 307	h m s	° ' "	9.5, 9.7	1907.0	87.6	2.88	2	1891.1	84.6	1.75
500	Hn. 4	0 53 10	+54 0	8.5, 9.0	1913.8	132.8	0.78	1	1881.6	125.0	0.97
* 508	β 302	0 54 19	+21 0	6.7, 8.1	1903.1 11.8	105.4 110.7	0.58 0.55	10 7	1876.3	92.5	0.75
518	Σ 78	0 55 12	+4 59	9.0, 9.5	1912.3	245.5	4.85	5	1831.4	245.5	5.26
520	Σ 79	0 55 49	+44 19	6.0, 7.0	1899.1	191.7	7.88	1	1832.5	192.4	7.62
524	Ma. 1	0 56 14	+46 55	7.9, 8.4	1901.0	29.5	0.97	1	1845.7	45.1	0.97
527	β 867	0 56 17	+11 32	8.1, 8.6	1912.0	173.4	0.81	8	1880.2	174.8	0.96
528	Σ 82	0 56 47	+9 5	8.3, 9.3	1912.2	303.6	1.67	10	1830.4	303.8	1.74
541	O Σ 21	0 58 37	+46 59	6.9, 8.2	1914.1	117.1	0.25	1	1847.8	177.1	0.58
548	Ho. 494	0 59 5	+26 53	8, 13	1907.6	95.3	13.07	3	1893.8	94.5	11.66
550	Ho. 495	0 59 18	+26 40	8, 12	1907.6	248.7	12.57	3	1893.8	251.6	11.91
551	Ho. 213	0 59 49	+35 4	7, 7	1912.6	208.2	0.31	5	1887.4	195.6	0.25 \pm
572	β 1228	1 1 52	+12 56	8.3, 8.9	1899.8 1912.7	275.2 269.2	0.74 0.75	10 5	1891.6	268.0	0.82
12,828	A. 932	1 5 3	+44 30	9.1, 10.2	1913.8	353.1	0.57	1	1905.9	344.5	0.89
* 600	O Σ 515	1 5 7	+46 50	4.9, 6.5	1912.7	212.5	0.26	8	1851.5	309.9	0.53
612	β 303	1 5 37	+23 24	7.1, 7.3	1898.5	283.5	0.62	19	1876.4	283.7	0.59
615	Hu. 602	1 6 1	+33 50	9.0, 10.2	1908.0	201.7	4.06	3	1902.8	203.0	4.12
* 614	β 235	1 6 6	+50 37	7.0, 7.4	1901.8	94.7	0.80	6	1875.7	74.0	0.48
12,831	A. 655	1 6 57	+40 49	7.3, 7.7	1912.6	141.2	0.28	4	1904.1	144.6	0.28
630	β 398	1 7 28	+47 25	9.0, 9.1	1913.8	47.8	1.86	1	1877.0	50.5	1.85
635	Σ 97	1 7 48	+51 8	8.5, 8.7	1899.1	101.8	4.51	1	1833.4	98.6	4.54
647	Σ 99	1 9 40	+24 12	4.7, 10.1	1895.9	226.4	7.89	1	1832.1	227.5	7.98
672	Σ 102	1 13 15	+48 38	7.0, 8.2	1910.7	304.9	0.76	1	1833.4	309.1	0.57
698	Da. 8	1 15 40	+43 34	7.7, 9	1914.1	145.2	2.97	1	1859.7	139.8	2.68
* 714	β 4	1 15 51	+11 10	7.0, 7.5	1902.7 13.4	67.1 65.7	0.33 0.33	5 3	1877.2	81.0	0.37
* 707	Σ 113	1 15 58	-0 54	6.2, 7.2	1897.2 1904.7 11.7	351.6 355.8 358.9	1.42 1.43 1.39	6 9 3	1836.9	334.3	1.18
718	Σ 115	1 18 30	+57 46	7.3, 7.5	1914.1	147.4	0.98	1	1836.7	150.0	0.81
746	Ho. 310	1 21 20	+27 10	9, 9.2	1907.1	356.2	1.56	5	1891.9	353.2	1.26
760	Σ 122	1 23 1	+3 10	7.0, 9.0	1899.1 1911.9	328.2 327.6	5.98 5.98	3 7	1833.6	332.8	5.79

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
758	β 999 CD	h m s 1 23 8	° ' " +45 2	10.7, 10.7	1898.9	136.8	5.32	1	1881.8	140.1	5.04
	† Espin 451	1 23 13	+50 5	9.1, 9.2	1914.1	69.0	2.47	1	1908.9	65.1	1.97
765	β 1164	1 23 47	+ 4 59	6.7, 7.0	1899.3	166.6	0.36	6	1890.8	168.4	0.39
763	A. Clark 14	1 23 52	+42 25	8.0, 9.0	1914.1	92.9	0.96	1	1859.8	95.6	0.78
764	Ho. 8	1 23 55	+34 18	9.7, 10.3	1907.1	248.6	4.09	1	1883.2	246.0	3.26
773	Ho. 9	1 25 0	+21 19	9, 10	1907.6	95.7	2.72	10	1883.9	92.8	2.77
780	Espin 4	1 26 36	+43 14	7.7, 9.7	1914.1	108.5	3.26	1	1893.0	104.9	3.47
790	β 506	1 27 28	+14 58	4, 11.0	1898.9	17.5	1.05	4	1878.7	12.9	1.02
798	Σ 133 AB	1 28 27	+35 28	7.0, 10.5	1899.1 1914.1	183.3 184.3	2.67 2.98	1 1	1833.0	179.1	2.99
	AC			10.8	1899.1 1914.1	191.6 190.2	29.91 28.23	1 1	1833.0	199.5	29.08
	CD			10.8	1899.1	169.3	5.03	1	1833.0	166.1	4.76
804	OΣ 31	1 29 23	+ 7 49	6.9, 11.0	1911.6	81.8	3.70	3	1850.0	85.0	4.04
806	Σ 135	1 29 53	+35 48	8.0, 10.7	1899.1	258.8	7.95	2	1830.8	259.0	7.92
816	Σ 137	1 31 13	+30 54	8.2, 9.0	1904.1	88.3	3.38	1	1833.1	86.6	3.37
824	β 507	1 31 47	+26 23	7.8, 10.6	1898.6 1910.4	156.2 156.7	2.02 2.09	7 7	1879.9	155.9	2.16
* 830	Σ 138	1 32 8	+ 7 16	7.3, 7.3	1897.9 1905.3 12.8	37.0 39.3 41.5	1.54 1.46 1.46	12 17 10	1830.2	20.0	1.47
845	Σ 140	1 34 33	+40 41	8.5, 9.2	1904.1	175.1	3.54	2	1833.1	172.3	3.35
854	β 5	1 35 12	+16 15	7.0, 9.0	1909.0	296.1	1.28	4	1875.5	289.4	1.34
856	Σ 141	1 35 39	+38 36	8.0, 8.5	1899.1 1908.0	301.4 299.0	1.73 1.75	2 2	1833.2	300.6	1.67
870	Σ 145	1 37 6	+25 22	6.0, 10.6	1899.1	30.2	11.14	1	1832.8	31.6	11.28
* 887	β 870	1 39 19	+57 10	6.9, 8.3	1914.1	55.3	0.89	1	1880.8	68.9	1.02
* 900	β 509	1 39 47	+ 9 12	8.4, 8.7	1901.1 11.4	255.9 245.7	0.72 0.84	6 5	1878.4	273.5	0.71
* 898	Σ 149	1 40 1	+39 35	8.2, 9.7	1907.7	103.4	1.41	4	1833.2	118.2	1.35
907	Σ 155	1 40 16	+ 9 7	7.5, 7.9	1900.5	327.8	4.75	4	1830.6	332.8	4.60
923	β 736 AB	1 42 15	+32 48	8.5, 10.3	1899.1	193.9	1.02	1	1879.9	209.0	0.86
	AC=Σ 157			9.0	1903.0	115.7	12.42	3	1832.9	115.5	12.26
* 926	Σ 158	1 42 25	+32 48	8.3, 8.8	1899.0 1910.9	258.9 257.4	1.98 2.00	18 9	1833.1	246.2	2.13
939	Espin 5	1 44 20	+48 4	8.7, 9.2	1914.1	105.8	2.87	1	1893.0	98.4	1.96

† B.D. + 49°386.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 946	β 510	<small>h m s</small> 1 44 30	<small>° ' "</small> +15 57	8.0, 12.0	1899.9 1911.4	<small>°</small> 330.6 331.2	<small>"</small> 1.80 1.49	2 2	1878.1	<small>°</small> 337.4	<small>"</small> 1.59
* 941	Σ 162	1 44 32	+47 32	7.0, 7.5	1914.0	212.3	1.95	2	1836.8	224.5	1.90
	AC			9.3	1914.0	178.8	21.08	2	1836.8	179.5	20.36
956	β 1016	1 45 27	+32 43	8.5, 8.5	1899.5	27.1	0.56	13	1890.9	27.8	0.59
977	Ho. 311	1 47 3	+24 17	7.0, 7.2	1900.3	178.6	0.40	15	1890.5	174.2	0.36
* 981	Σ 178	1 48 3	+10 26	7.8, 7.8	1907.9 12.0	198.5 197.9	3.14 2.99	3 11	1829.0	193.3	3.08
982	Hu. 805	1 48 15	+33 33	8.8, 11.0	1909.8	164.3	2.64	4	1902.8	162.1	2.85
	AC				1909.0	257.6	10.77	3			
986	Σ 3113	1 48 47	+44 17	8.7, 8.7	1914.1	269.6	1.14	1	1833.2	270.5	1.49
* 992	β 260	1 49 10	+15 4	8.3, 9.0	1903.9 11.6	238.0 240.0	0.69 0.73	6 5	1875.8	228.1	0.56
993	Σ 180	1 49 23	+18 55	4.2, 4.4	1907.0	359.2	8.39	19	1830.8	360.0	8.63
994	β 512	1 49 38	+18 55	9.0, 13	1900.9	19.9	1.56	3	1878.0	27.3	1.45
1,000	† Lewis 1	1 51 2	+18 52	9, 10	1905.7	58.8	6.86	3			
* 1,002	Σ 183	1 50 50	+28 26	7.5, 8.2	1898.8 1905.3 12.4	0.2 357.2 353.9	0.52 0.42 0.44	13 11 9	1833.1	22.3	0.55
	AB, C			8.8	1903.3	162.2	5.40	6	1832.3	163.7	5.68
	AC				1899.9 1910.3	162.9 162.7	5.46 5.49	16 14			
1,004	H. 1096	1 50 58	+15 15	10, 15	1910.0	175.5	7.54	1	1828+	179.4	8±
* 1,015	Σ 186	1 51 59	+ 1 28	7.2, 7.2	1902.9 07.9 12.2	28.0 34.3 36.1	0.46 0.66 0.94	4 3 3	1831.1	64.7	1.23
12,871	Hu. 1033	1 52 26	+36 4	8.5, 8.8	1907.0	234.4	0.85	1	1904.6	239.7	0.96
12,873	A. 819	1 52 42	+30 39	7.8, 9.3	1910.7	136.1	0.42	3	1904.8	131.8	0.53
1,021	Σ 189	1 53 1	+18 35	8.7, 9.8	1899.1	267.6	8.92	2	1829.5	269.6	8.52
1,038	Ho. 11	1 55 1	+33 51	9.0, 9.4	1906.5	140.6	4.78	2	1884.3	139.7	4.59
* 1,039	Σ 194	1 55 1	+24 28	8.0, 8.3	1906.4 12.2	273.3 271.4	1.17 1.16	8 15	1831.5	264.1	1.24
1,043	Σ 196	1 55 23	+20 39	8.5, 11.0	1910.4	51.3	2.24	4	1832.4	55.5	2.37
1,041	Σ 195	1 55 30	+44 5	8.5, 8.8	1914.1	194.5	2.86	1	1832.5	194.6	3.06
1,056	Σ 200	1 57 24	+23 44	8.5, 9.0	1904.1	126.3	7.96	1	1832.6	124.2	7.98
* 1,061	Σ 202	1 58 10	+ 2 24	2.8, 3.9	1913.1	311.8	2.34	5	1831.2	335.7	3.64
1,059	Ho. 12	1 58 19	+34 18	8.0, 10.7	1907.5	103.9	3.64	4	1883.9	100.4	3.10

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
1,064	Σ 201	<small>h m s</small> 1 58 35	<small>° ' "</small> +32 55	5.3, 11.3	1908.0	119.6	3.64	1	1833.1	119.6	3.72
* 1,070	OΣ 38=Σ 205 BC	1 59 16	+41 58	5.0, 6.2	1898.2 1901.9 09.5 14.3	120.5 115.8 115.5 115.4	0.30 0.39 0.40 0.45	8 11 9 5	1843.5	125.5	0.48
	Σ 205 AB			3.0, 5.0	1903.8	63.6	10.12	9	1830.0	62.4	10.33
	A, BC				1900.0	62.2	9.76	1			
* 1,074	Σ 208	1 59 22	+25 34	6.2, 8.4	1898.1 1902.6 07.1 10.8 13.9	61.6 70.9 84.9 99.1 129.1	0.76 0.66 0.48 0.29 0.25	8 7 2 5 2	1833.1	25.2	1.98
1,105	Σ 214	2 2 33	+25 20	8.0, 9.8	1904.1	191.0	5.44	1	1831.9	190.3	5.24
1,098	Ho. 312	2 2 34	+25 20	6.5, 12	1906.3	341.7	1.18	3	1890.1	330.1	1.09
1,129	Σ 224	2 6 47	+13 19	7.5, 8.0	1904.9	242.7	5.55	1	1830.5	242.4	4.97
1,139	Σ 226	2 7 59	+23 36	7.8, 9.7	1904.7	246.7	2.25	3	1832.2	249.8	2.42
* 1,137	Σ 227	2 8 1	+29 57	5.0, 6.4	1911.3	73.2	3.65	15	1836.7	80.5	3.68
1,140	Ho. 497	2 8 14	+37 0	8.2, 9.0	1900.6 12.0	68.5 73.0	0.53 0.58	4 2	1894.8	73.7	0.44
1,149	Σ 231	2 9 6	- 2 46	6.0, 7.8	1901.1	231.7	16.10	2	1832.7	228.9	15.54
* 1,144	Σ 228	2 9 13	+47 7	6.7, 7.6	1899.4 1911.6	81.1 108.8	0.44 0.62	12 4	1831.5	262.1	1.08
1,150	Σ 229	2 9 30	+34 9	8.6, 10.0	1909.6	354.4	2.42	4	1832.9	1.0	2.43
1,154	Hu. 424	2 9 47	+23 20	9.0, 11.0	1905.1	335.4	1.56	3	1901.8	335.7	1.63
1,153	Hu. 807	2 9 53	+34 33	8.4, 8.6	1910.1	147.8	0.62	2	1902.8	144.4	0.51
1,169	Σ 236	2 12 15	+52 7	8.5, 9.3	1908.1	260.5	0.98	2	1831.9	259.1	0.81
1,184	Σ 240	2 13 0	+23 41	7.7, 8.2	1904.9	50.0	4.85	1	1832.2	48.0	4.71
1,186	Tucker	2 13 9	+37 44	8.5, 10.5	1908.0	239.9	3.11	2	1901.1	240.8	2.69
12,881	A. 959	2 13 33	+30 54	9.0, 12.0	1907.3	0.7	3.84	3	1905.8	359.2	3.98
* 1,212	Σ 248	2 16 20	+42 26	8.9, 8.9	1913.0	147.3	1.13	2	1832.1	161.0	1.64
12,886	A. 962	2 16 42	+29 35	8.9, 9.2	1909.5	71.5	0.47	2	1905.8	64.3	0.56
1,215	Σ 249	2 16 49	+44 15	7.0, 9.0	1908.1	192.1	2.22	3	1831.1	194.7	2.28
* 1,224	Σ 254	2 17 21	+23 17	8.5, 10.0	1912.0	351.8	12.28	2	1831.8	334.1	13.33
1,226	β 8	2 17 22	+ 8 32	8.3, 9.2	1911.6	204.3	0.98	8	1875.3	200.4	0.96
1,240	β 876	2 19 26	+33 10	7.5, 12.3	1895.9	233.6	1.00	1	1880.1	235.4	1.19
	CD=Σ 258			9.5, 10.2	1897.5	31.4	6.01	2	1832.5	26.8	5.89

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
1,247	Ho. 313	h m s	° ' "	8.3, 8.7	1908.0	82.3	1.86	1	1890.0	75.7	1.42
* 1,235	Σ 257	2 19 36	- 8 12	7.2, 7.7	1900.2 15.1	248.5 268.2	0.37 0.22	1 1	1830.5	164.9	0.60
1,253	Ho. 314	2 20 19	- 8 14	8.4, 10.2	1908.0	196.7	4.56	1	1890.0	198.4	3.95
1,254	Hu. 537	2 21 6	+48 53	8.2, 9.2	1914.1	23.8	1.81	1	1902.7	16.6	1.92
1,255	Σ 260	2 21 15	+53 56	8.2, 8.7	1904.1	350.3	6.68	2	1831.2	348.1	6.58
1,264	Ho. 216	2 22 33	+30 57	8.0, 10.5	1906.8	341.5	1.05	4	1887.0	331.4	0.98
1,276	Hu. 428	2 23 56	+23 0	9.2, 9.5	1908.5	64.2	0.58	2	1901.9	59.8	0.49
1,278	Σ 269	2 24 24	+29 35	7.5, 9.8	1907.9	340.6	1.87	6	1832.4	340.4	1.90
12,895	Hu. 603	2 24 50	+22 34	8.5, 11.8	1912.4	226.3	5.14	3	1901.9	226.8	5.31
1,288	β 519	2 25 54	- 2 36	8.2, 9.7	1901.5	55.2	0.62	2	1878.4	58.8	0.80
1,294	Ku. 10	2 26 54	+32 35	9.4, 10.0	1909.3	354.2	3.22	3	1901.4	355.5	3.50
1,303	Σ 273	2 27 53	+18 3	7.7, 8.7	1904.1	359.0	6.90	1	1830.9	358.3	6.87
* 1,299	$O\Sigma$ 42	2 28 9	+51 59	7.0, 7.5	1901.5 10.4 15.1	134.9 136.3 125.1	0.22 0.22 0.24	3 3 1	1847.6	110.0	0.40
1,316	Hu. 63	2 30 18	+11 30	9.0, 9.4	1911.6	288.7	0.93	7	1888.1	289.0	1.17
* 1,346	Σ 285	2 34 23	+33 6	7.0, 7.7	1911.9	169.5	1.68	10	1832.1	177.5	1.85
12,904	Hu. 1043	2 34 47	+15 6	9.0, 9.5	1911.6	59.6	2.77	9	1904.9	58.1	3.00
1,353	Σ 287	2 34 52	+14 32	7.5, 9.8	1910.0	69.3	6.84	1	1830.9	73.9	6.56
{ 1,354 12,905	β 1315 = Hu. 1044	2 34 59	+14 11	8.3, 9.3	1909.3 12.4	129.6 129.1	1.50 1.58	7 12	1903.8	130.7	1.51
	CD				1908.9	32.2	6.01	3			
1,357	Ho. 315	2 35 12	- 1 54	8.0, 8.2	1907.0	0.9	1.35	3	1891.9	359.2	1.04
1,364	Σ 289	2 36 16	+26 44	5.8, 8.7	1911.3	0.1	28.95	4	1831.7	359.4	28.54
* 1,365	$O\Sigma$ 43	2 36 18	+26 17	7.2, 8.8	1896.1 1911.6	44.5 42.0	0.87 1.13	1 12	1848.7	93.0	0.46
1,375	$O\Sigma$ 44	2 37 22	+42 23	7.8, 8.5	1900.1	54.9	1.32	7	1850.2	58.6	1.47
* 1,386	Σ 295	2 37 21	- 1 0	6.0, 9.2	1909.9 15.0	321.2 316.5	4.05 4.66	1 1	1831.9	334.6	4.85
1,398	β 306	2 39 27	+25 20	6.4, 11.0	1905.0	16.7	3.01	3	1870.8	17.3	2.93
1,401	Σ 299	2 39 26	+ 2 56	3.0, 6.8	1912.0	289.4	2.95	3	1836.7	289.2	2.67
1,402	Hu. 430	2 39 39	+20 40	8.5, 12.8	1905.1	188.2	0.77	1	1902.0	203.1	0.88
* 1,405	Σ 300	2 40 9	+29 9	7.9, 8.1	1911.0	306.6	3.02	12	1832.8	299.6	2.91
12,910	A. 826	2 40 18	+31 11	8.7, 11.8	1905.1	165.7	4.16	1	1904.8	163.2	4.19
1,410	Σ 303	2 40 52	- 2 16	8.5, 9.5	1915.0	181.1	5.63	1	1831.2	180.6	5.65

β.G.C.	Name.	1925°0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
12,912	Hu. 1046	h m s	° ′			°	"			°	"
		2 40 58	+13 52	7.5, 11.2	1912.0	92.1	0.88	1	1904.8	92.6	1.08
* 1,420	β 83	2 42 15	- 5 16	7.5, 10.1	1901.8 15.0	103.3 99.2	0.92 1.00	1 1	1876.0	121.3	1.40
* 1,427	Σ 305	2 43 12	+19 4	7.3, 8.2	1897.6 1902.8 07.3 12.8	316.4 315.0 314.8 314.5	2.94 3.02 3.11 3.06	13 22 14 11	1831.0	330.9	1.59
1,424	β 262	2 43 14	+30 45	8.0, 10.0	1897.4 1901.6 11.1	61.3 65.3 65.4	1.50 1.60 1.46	8 5 2	1876.3	65.7	1.57
12,913	Hu. 604	2 43 41	+36 1	9.0, 11.0	1908.6	195.4	1.95	2	1903.4	210.3	1.92
1,442	Ho. 217	2 44 44	+34 13	8.5, 10.7	1905.0	276.2	2.87	1	1887.0	276.0	2.02
* 1,445	Σ 310	2 44 51	+33 37	7.7, 10.9	1908.1	97.6	2.65	3	1832.1	86.3	2.55
1,448	Σ 311	2 45 8	+17 9	4.9, 8.4	1912.4	117.7	3.05	7	1832.3	119.3	3.28
1,465	Ho. 218	2 47 27	+ 2 45	7 , 7	1910.1	96.6	0.19	1	1889.9	210±	0.4±
* 1,459	Σ 314	2 47 32	+52 41	6.9, 7.1	1913.6	304.0	1.53	2	1830.5	295.4	1.46
* 1,471	β 524	2 48 57	+38 2	6.0, 6.7	1898.9 99.1 99.9 1901.1 02.1 03.1 03.9 10.1 11.1 14.1 15.1	36.6 29.5 19.7 11.2 19.0 357.4 25.9 312.4 316.7 304.8 290.1	.. .. 0.16 0.18 0.19 0.15 0.21 0.27 0.17 0.31 0.27	1 1 1 2 3 3 3 3 1 1 1	1880.5	321.4	0.22
	AC=Σ 318			5.5, 10.0	1896.1 1903.1	237.4 236.1	13.92 14.24	1 3	1829.1	236.8	14.08
1,485	Ho. 316	2 50 55	+27 25	7.0, 13.0	1907.6	282.5	19.88	3	1891.9	284.4	19.77
* 1,487	Σ 325	2 51 8	+34 11	8.2, 9.7	1914.1	182.4	10.30	1	1831.0	253.4	11.70
1,490	Σ 326	2 51 9	+26 35	7.5, 9.7	1910.8	216.6	7.66	3	1831.5	216.1	9.03
1,494	Ho. 317	2 52 53	+16 56	8.1, 11.0	1907.2	304.4	3.41	4	1890.0	307.9	2.83
* 1,501	β 1173	2 54 14	+23 50	7.7, 7.8	1901.1 03.1 10.3	330.8 338.6 344.0	0.34 0.16 0.22	1 3 5	1890.9	325.4	0.13
* 1,508	β 525	2 54 34	+21 19	7.0, 7.0	1897.8 1902.4 09.9	130.9 135.1 155.2	0.29 0.26 0.30	16 13 9	1877.7	105.1	0.59
1,506	Ho. 219	2 54 43	+34 35	8.1, 12.2	1907.9	244.1	7.94	1	1890.0	243.8	6.31
* 1,512	Σ 333	2 54 55	+21 3	5.7, 6.0	1898.3 1902.7 07.4 12.7	202.0 202.2 200.6 202.3	1.29 1.26 1.27 1.39	12 18 9 16	1830.2	188.9	0.55

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
1,515	Ho. 318	<small>h m s</small> 2 55 15	<small>o ' "</small> +16 45	9.1, 9.1	1907.4 14.2	<small>o</small> 205.8 203.0	<small>"</small> 3.17 3.62	5 4	1890.1	<small>o</small> 203.4	<small>"</small> 2.02
* 1,517	Σ 334	2 55 24	+ 6 21	7.7, 8.2	1912.7	312.2	1.40	8	1830.9	322.8	1.59
* 1,526	O Σ 49	2 56 19	+17 43	7.0, 10.0	1911.9	60.8	1.81	10	1846.8	71.1	1.71
1,532	Hu. 431	2 56 47	+21 21	9.4, 9.7	1910.9	190.7	0.94	2	1902.0	192.6	0.96
* 1,559	Σ 346	3 1 1	+24 58	6.0, 6.0	1902.4 10.5	270.6 273.8	0.47 0.39	17 11	1832.0	264.5	0.73
	AC				1901.8 11.0	355.8 355.9	5.21 5.18	5 4			
	AB, C			10.8	1906.1	352.1	5.03	2	1832.4	357.2	5.21
	BC				1915.0	351.6	5.08	1			
1,564	A.G. 61	3 2 34	+20 35	8.8, 9.5	1913.6	28.6	0.87	3	1901.8	26.0	0.74
1,572	Σ 355	3 3 18	+ 8 7	8.7, 9.5	1912.6	145.8	2.59	6	1832.5	148.7	2.75
1,577	Σ 352	3 4 2	+35 11	8.2, 10.3	1904.2 13.5	359.1 3.3	3.64 3.53	2 2	1831.5	6.8	3.50
*1,584	β 1030	3 5 47	+21 28	8.4, 8.4	1898.1 1902.3 10.5	160.9 156.5 150.3	0.48 0.52 0.49	12 11 9	1888.8	164.6	0.58
1,588	Glazenapp I	3 6 37	+14 51	9.3, 9.4	1911.8	267.7	4.27	6	1893.0	267.2	4.02
1,591	Ho. 500	3 7 7	+35 48	8.5, 9	1911.4	37.5	0.69	3	1896.9	35.7	0.46
*1,594	Σ 360	3 7 23	+36 56	7.8, 8.0	1912.4	133.7	2.07	7	1831.2	146.4	1.34
1,597	Ho. 501	3 7 40	+34 42	8, 12	1907.0	202.0	9.14	2	1897.0	205.8	7.75
*1,598	O Σ 51	3 7 53	+44 0	7.9, 8.1	1913.1	311.0	1.22	3	1848.8	300.0	1.40
1,617	β 530 BC	3 9 53	+22 40	9.7, 10.4	1899.4	191.7	1.86	8	1879.2	195.8	1.77
*1,623	Σ 367	3 10 10	+ 0 28	8.0, 8.0	1910.6	203.9	0.64	3	1831.7	281.4	0.95
1,619	Ho. 502	3 10 14	+35 27	8.5, 9.0	1911.4	20.1	0.69	3	1895.0	15.9	0.54
*1,640	β 84	3 12 19	- 6 12	7.2, 7.4	1899.9	22.6	0.66	2	1875.9	10.3	0.44
*1,639	O Σ 53	3 12 52	+38 22	7.2, 8.0	1902.4 10.1	232.2 217.2	0.59 0.51	8 6	1845.5	273.1	0.68
1,663	Σ 375	3 15 56	+23 25	8.0, 10.1	1904.1	315.0	2.41	1	1833.0	317.5	2.03
1,676	Ho. 320	3 17 0	+ 0 54	8.0, 10.5	1908.0	169.2	2.08	1	1890.1	167.5	1.17
*1,678	Σ 380	3 17 41	+ 8 30	8.3, 9.3	1909.9 15.0	62.1 53.4	1.19 1.13	1 1	1831.6	90.1	1.20
1,683	Σ 381	3 18 59	+20 43	7.0, 8.7	1911.8	98.1	1.02	16	1830.2	91.0	0.82
12,934	Hu. 1058	3 20 2	+39 57	7.8, 8.5	1909.4	117.2	0.75	8	1905.0	114.1	0.80
1,695	Ho. 322	3 20 50	+45 20	9.0, 9.5	1907.2	124.1	1.90	1	1893.3	116.5	1.27
12,935	A. 979	3 21 10	+30 28	9.2, 10.0	1907.3	271.9	1.47	3	1905.8	269.2	1.44

β.G.C.	Name.*	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
1,698	Σ 384	h m s	° ' "			°	"			°	"
		3 22 22	+59 39	7.8, 9.0	1904.2	269.2	1.82	1	1830.6	267.5	1.99
1,708	Σ 389	3 24 5	+59 7	7.0, 8.0	1904.2	59.4	2.65	1	1831.0	61.8	2.80
1,720	β 878	3 24 5	+22 33	6.0, 12.2	1899.7	77.6	1.13	3	1881.1	78.0	1.10
1,719	Σ 395	3 24 10	+28 49	8.5, 10.0	1906.8	103.5	2.07	3	1832.4	106.4	1.92
12,941	A. 983	3 26 23	+29 21	8.5, 9.2	1909.0	307.3	0.45	3	1905.1	307.8	0.48
1,754	Ho. 14	3 28 39	+28 1	8.2, 8.7	1906.0	22.8	1.98	2	1883.5	21.1	1.82
12,943	Hu. 1061	3 28 40	+15 17	8.2, 12.3	1910.0	52.3	3.27	1	1904.7	50.1	2.87
*1,761	Σ 412	3 29 59	+24 13	6.6, 6.7	1896.6	199.5	0.34	8	1830.4	269.9	0.69
					1901.5	189.5	0.23	11			
					10.0	147.6	0.22	4			
					13.8	131.1	0.21	7			
	AC			10.0	1907.4	59.3	22.33	5	1830.9	63.0	22.41
1,764	Σ 410	3 30 19	+31 46	7.8, 11.8	1899.9	205.7	5.82	1	1831.5	208.8	5.42
1,770	Σ 413	3 30 44	+33 26	8.5, 8.5	1911.6	128.1	2.60	10	1831.5	130.3	2.47
*1,774	β 533	3 30 56	+31 26	7.0, 7.0	1898.9	50.4	0.54	8	1878.7	66.1	0.43
					1902.6	48.4	0.53	14			
					12.2	45.2	0.62	15			
1,779	Σ 420	3 32 3	+23 40	8.5, 10.8	1904.1	113.7	6.79	1	1831.7	111.3	6.47
1,778	Hn. 9	3 32 22	+47 52	8.5, 8.5	1913.6	60.3	1.39	2	1881.6	62.8	1.33
	AC				1913.2	68.1	58.25	1			
*1,799	Σ 425	3 35 23	+33 53	7.3, 7.3	1903.0	90.5	2.45	12	1830.2	104.6	2.87
					10.6	90.5	2.43	6			
1,808	Ho. 323	3 35 52	+28 23	8, 13	1906.0	211.2	17.28	1	1891.8	214.2	16.03
12,950	Hu. 1065	3 36 2	+14 49	9.2, 12.0	1910.0	347.1	3.25	1	1904.7	343.8	3.18
12,952	A. 987	3 37 49	+29 31	9.6, 9.7	1907.4	7.6	1.09	3	1905.8	10.2	1.04
1,829	Σ 438	3 39 4	+22 30	8.5, 10.5	1907.5	243.5	1.95	3	1832.5	241.4	1.70
*1,834	β 535	3 39 36	+32 3	4.0, 8.5	1903.4	52.3	0.90	6	1878.3	56.8	0.83
					15.0	44.9	0.87	2			
1,835	Ho. 504	3 39 44	+35 37	7.8, 8	1906.4	186.9	1.05	8	1897.0	185.3	0.75
1,838	Barnard 3	3 39 48	+23 52	9.6, 9.8	1910.5	143.5	1.53	2	1892.0	147.3	1.52
1,831	Hu. 103	3 39 51	+49 38	8.1, 8.4	1908.1	206.2	0.92	3	1900.2	207.7	0.84
1,836	β 880	3 39 51	+31 56	8.7, 8.9	1899.0	353.7	0.44	8	1880.9	353.7	0.45
					1902.1	8.8	0.61	5			
					14.2	1.6	0.60	2			
	A, BC=Σ 439			8.0, 9.2	1906.6	39.0	23.43	2	1831.0	38.1	23.20
1,845	Σ 442	3 40 33	+22 29	9.0, 9.5	1910.4	266.5	2.38	13	1832.5	271.7	2.50
1,853	Σ 444	3 41 25	+22 55	7.7, 10.7	1904.1	339.0	4.02	1	1832.3	339.0	3.28

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*1,856	β 536	h m s 3 41 49	° ' " +23 58	8.3, 9.3	1899.15 1902.05 3.06 14.15	° 298.5 292.8 292.9 272.6	" .. 0.17 .. 0.23	1 2 1 1	1878.7	° 336.4	" 0.44
	CD			8.0, 12	1899.2 1914.2	10.1 8.7	18.71 18.06	1 1	1878.7	11.2	18.17
1,866	β 537	3 42 36	+24 37	8.5, 10.5	1904.1	194.6	0.96	2	1877.9	185.9	0.60
	† Lewis	3 42 37	+24 26	9.0, 9.0	1904.1	195.9	0.59	2			
12,956	Hu. 1066	3 42 37	+20 33	9.0, 10.3	1912.1	268.1	1.28	3	1904.8	268.8	1.20
1,872	Σ 449	3 42 56	+24 26	8.5, 11.0	1904.1	328.8	7.06	1	1832.2	330.9	6.79
1,873	Σ 450	3 42 58	+23 42	8.0, 10.0	1908.9	263.9	6.01	5	1832.2	267.2	5.72
1,880	β 538	3 43 32	+23 53	10, 11	1901.1	135.2	2.06	1	1877.7	138.0	2.27
1,882	β 1184	3 43 55	+22 9	8.1, 8.3	1898.3 1902.7 14.2	269.7 271.8 288.0	0.55 0.49 0.74	6 8 1	1890.8	272.3	0.62
1,886	Σ 452	3 44 9	+10 55	4.5, 9.6	1904.1	62.2	9.03	1	1830.7	57.9	8.90
1,885	O Σ 516	3 44 23	+32 2	7.2, 9.2	1906.6	44.8	2.19	2	1854.4	40.1	2.35
12,958	Hu. 1067	3 44 39	+38 46	8.8, 9.1	1911.9	73.0	1.08	3	1904.9	74.8	1.40
1,887	Σ 453	3 44 41	+23 50	5, 8	1904.13 04.19 09.14 13.00 13.14 14.16	45.6 40.8 48.4 159.2 176.2 47.4	0.47 0.39 0.64 0.32 0.57 0.35	2 1 1 1 1 1	1830	29.2	0.35
1,890	Ho. 324	3 44 45	+14 44	8.1, 8.3	1906.1	337.5	0.66	8	1890.1	341.7	0.48
1,895	Σ 458	3 45 18	+18 4	9.0, 9.3	1907.5	199.0	5.01	3	1831.1	195.2	4.94
1,897	O Σ 64	3 45 32	+23 37	7.0, 9.9	1910.9	230.3	3.52	1	1847.2	239.0	3.25
	AC			9.0	1910.9	232.0	9.77	1	1847.2	237.2	10.58
*1,900	O Σ 65	3 45 48	+25 21	6.5, 6.8	1896.1 1909.6 13.6	203.3 201.7 202.6	0.57 0.43 0.51	1 6 9	1846.2	209.2	0.74
1,903	Σ 457	3 45 53	+22 27	8.8, 8.8	1904.1	103.0	1.12	1	1831.2	104.8	1.26
1,906	O Σ 66	3 47 0	+40 34	7.5, 8.0	1900.4	138.5	0.55	7	1846.4	136.1	0.48
1,936	Ho. 325	3 50 40	+30 49	6, 12	1907.9	11.3	22.75	1	1892.0	12.3	21.78
1,946	Hu. 815	3 51 31	+21 33	8.0, 12.0	1907.8	204.5	2.46	4	1902.1	205.5	2.64
1,950	Σ 471	3 52 49	+39 48	3.1, 8.3	1899.2	7.8	8.81	1	1832.6	9.2	8.81
1,960	Hu. 24	3 53 28	+11 17	8.5, 11.3	1906.1	268.8	1.09	3	1900.1	265.0	1.45
1,956	Ho. 505	3 53 34	+32 32	8, 10	1907.0	194.9	1.23	1	1897.0	194.4	1.12
1,967	Hu. 25	3 54 19	+11 55	8.6, 9.1	1906.1	324.5	0.78	3	1900.1	325.7	0.79

† B.D. + 24° 56' ?

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"			°	"
1,976	Hu. 27	3 54 52	+ 9 35	8.1, 8.5	1907.1	213.3	0.43	2	1899.5	210.8	0.55
1,978	Hu. 28	3 55 31	+11 15	9.0, 9.2	1909.3	344.8	1.07	4	1900.1	342.1	0.97
1,980	Σ 478	3 55 39	+11 20	8.2, 9.2	1905.1	137.5	9.65	1	1829.8	137.2	9.57
1,985	Σ 479	3 56 30	+23 0	7.0, 7.9	1909.5	126.8	7.32	5	1831.7	128.5	7.41
*1,983	Σ 476	3 56 34	+38 28	7.5, 8.7	1911.9	287.1	21.04	1	1831.9	283.8	17.58
1,990	Σ 481	3 57 38	+27 55	7.2, 10.8	1911.8	107.9	2.74	1	1832.2	106.6	2.22
	AC			9.2	1911.8	328.2	16.85	1	1832.2	329.2	18.78
*2,007	Σ 483	3 59 2	+39 19	8.0, 9.5	1897.53 99.19 1900.20 03.13 04.13 07.19 08.19 09.15	314.7 290.3 289.5 229.8 236.6 223.6 196.7 192.9	0.65 0.55 0.40 0.46 0.50 0.43 0.59 0.65	2 6 2 1 2 2 2 2	1830.5	11.6	2.80
	Lewis	3 59	+39 19	10.5, 10.5	1899.2	163.4	0.52	7			
2,019	β 1277	4 1 1	+28 12	8.0, 12.2	1907.2	300.7	0.75	1	1898.8	259.0	1.34
2,025	β 1005	4 2 6	+28 45	8.5, 11.7	1907.2	64.2	2.40	1	1881.9	62.7	3.35
*2,027	OΣ 531	4 2 33	+37 53	6.5, 8.2	1898.2 1903.9 13.3	128.7 128.1 123.7	1.94 1.93 1.51	10 6 6	1855.6	147.9	3.30
*2,034	β 493	4 2 45	+ 5 30	8.5, 9.0	1909.0	91.8	1.48	1	1831.7	98.1	1.83
*2,041	Σ 3114	4 4 5	+39 58	8.0, 10.5	1907.4	171.8	2.25	5	1832.4	190.1	1.92
2,045	β 1232	4 4 13	+28 59	8.4, 9.3	1898.1 1909.9	353.0 347.9	0.35 0.48	3 5	1892.0	350.4	0.30
*2,050	Ho. 326	4 4 30	+28 27	8.0, 8.0	1898.8 1905.6 13.1	175.5 185.4 191.8	0.33 0.41 0.46	5 4 1	1890.1	166.5	0.29
2,052	Ho. 327	4 4 53	+31 27	6.3, 12	1906.6	315.4	15.85	2	1892.1	321.7	16.26
2,058	Σ 499	4 5 36	+23 55	9.2, 9.3	1911.6	286.9	1.58	11	1833.5	291.1	1.64
	AC			11.2	1911.9	280.5	30.12	1	1833.5	279.5	30.29
2,059	β 546	4 6 17	+41 40	8.0, 8.0	1903.6 13.7	31.6 31.6	0.88 0.78	2 2	1878.7	24.3	0.92
2,068	OΣ 74	4 8 11	+ 9 27	8.0, 8.5	1908.4	293.9	0.42	3	1849.2	270.1	0.53
*2,093	OΣ 77	4 11 9	+31 31	7.5, 7.5	1899.1 1901.1 03.1 07.2 08.8 14.1	166.1 178.0 195.4 197.8 202.6 223.2	0.24 0.22 0.23 0.28 0.25 0.37	3 1 2 1 3 6	1846.1	338.2	0.37
	AC			8.0	1914.2	42.9	55.91	1	1847.2	41.7	56.49
	AD			8.5	1914.2	313.3	127.8	1	1873.7	312.8	127.10

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
2,110	Ho. 328	h m s	° ' "			°	"			°	"
		4 12 39	+19 28	7.0, 7.0	1912.0	169.6	0.31	6	1890.1	176.4	0.36
*2,115	Σ 520	4 13 47	+22 38	8.0, 8.0	1909.1	115.4	0.71	7	1837.1	98.7	0.96
*2,134	O Σ 79	4 15 37	+16 21	7.0, 8.8	1899.07 1913.64	241.5 306.4	0.39 0.33	1 3	1846.1	24.3	0.76
2,136	Σ 522	4 16 42	+51 26	8.5, 8.5	1904.2	215.0	1.55	1	1831.2	217.8	1.54
2,139	Σ 524	4 17 26	+49 24	8.5, 9.5	1904.2	54.7	6.86	1	1830.2	54.7	6.70
2,145	Ho. 508	4 18 9	+35 17	8, 12	1907.9	222.5	4.22	1	1897.0	222.2	3.81
2,151	Σ 529	4 18 15	+28 14	8.4, 10.2	1904.2	15.4	4.54	1	1832.4	19.1	4.44
*2,146	O Σ 80	4 18 22	+42 16	6.5, 7.0	1900.7 13.1	181.4 180.3	0.53 0.52	12 9	1848.4	188.6	0.52
*2,154	O Σ 82	4 18 29	+14 53	7.0, 9.0	1895.11 1899.60 1912.44	141.1 128.5 93.3	0.86 0.49 0.62	3 5 8	1848.7	230.4	1.04
*2,161	Σ 535	4 19 8	+11 13	6.7, 8.2	1896.8 1902.9 11.6	327.9 324.5 322.1	1.64 1.61 1.53	13 15 12	1831.3	353.9	1.95
12,986	A. 834	4 19 12	+56 13	8.2, 8.8	1914.2	228.1	0.26	1	1904.9	220.5	0.37
	AC				1914.2	83.1	25.71	1			
2,165	Hu. 303	4 19 34	+21 23	8.5, 12.0	1909.1	193.2	2.45	1	1901.8	199.1	2.15
2,164	Ho. 15	4 19 45	+29 58	8.0, 8.0	1906.5	146.4	0.72	8	1882.1	147.2	0.81
*2,163	O Σ 81	4 19 45	+33 48	6.0, 8.8	1909.2	37.6	4.43	4	1847.9	53.0	4.49
*2,172	Hu. 304	4 19 46	+9 18	5.9, 5.9	1911.6	41.2	0.28	6	1901.4	23.9	0.25
2,174	β 1235	4 20 0	+22 35	8.4, 8.5	1900.6	61.8	0.27	5	1891.8	60.8	0.35
*2,200	Σ 546	4 22 37	+18 57	7.7, 9.5	1911.5	184.5	6.89	7	1836.1	189.9	6.65
2,192	β 745	4 22 44	+53 44	8.3, 8.3	1899.2 1914.2	136.0 130.6	0.70 0.46	1 1	1891.9	134.1	0.52
2,207	β 1186	4 23 20	+11 2	6.8, 9.7	1909.5	173.3	0.58	3	1890.9	182.1	0.59
12,992	Hu. 1080	4 25 50	+16 3	6.5, 7.5	1912.2	255.4	0.36	12	1904.8	263.1	0.44
2,234	Σ 553	4 27 30	+50 54	8.0, 8.5	1904.2	132.0	3.06	1	1831.2	133.3	3.15
*2,255	Σ 562	4 30 16	+22 33	7.0, 10.7	1910.8	279.3	1.86	6	1830.9	269.6	2.05
2,256	†Lewis 4	4 31 18	+19 44	7.5, 8.0	1902.3	192.0	0.34	5			
2,266	β 550	4 31 36	+16 22	1.0, 13.5	1899.8 1910.0	110.1 109.0	31.06 32.29	6 1	1877.9	109.0	30.45
	AE				1899.1	331.1	30.96	1			
	CD= β 1031			11.2, 13.6	1899.1	276.6	2.22	2	1888.9	281.1	2.34
12,999	Hu. 1084	4 31 55	+39 39	8.3, 8.7	1913.7	40.4	0.66	2	1904.9	43.7	0.70

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 2,270	OΣ 86	h m s 4 32 11	° ' " +19 37	7.5, 7.5	1898.8 1902.3 11.2	° ' " 54.0 61.1 58.1	" ' " 0.47 0.44 0.42	6 15 10	1845.7	° ' " 78.6	" ' " 0.55
* 2,272	Σ 567	4 32 18	+19 21	8.5, 9.0	1899.0 1902.9 10.5	322.4 319.9 322.9	1.95 1.83 1.86	4 16 15	1831.2	302.9	1.43
2,275	Hu. 305	4 32 30	+20 54	9.0, 10.2	1909.3	278.7	1.99	9	1901.8	277.0	2.21
* 2,274	Σ 565	4 32 50	+41 59	7.2, 8.5	1914.0	173.3	1.47	5	1831.6	180.3	1.61
	AC				1914.2	109.4	29.52	2			
* 2,284	Σ 572	4 33 51	+26 48	6.5, 6.5	1897.4 1903.3 10.0	201.2 201.2 200.2	3.60 3.70 3.70	13 19 8	1830.6	210.3	3.17
* 2,279	Σ 566	4 33 59	+53 20	5.1, 7.4	1914.2	284.2	1.47	1	1829.8	311.4	1.58
2,295	Hu. 441	4 35 10	+20 37	9.0, 11.0	1913.0	46.3	1.80	1	1901.9	50.3	1.79
2,302	β 1044	4 35 35	+16 23	9.0, 11.0	1907.2	219.8	0.66	1	1888.9	218.5	1.03
* 2,307	Σ 577	4 37 9	+37 23	7.7, 7.7	1893.1 1911.6	72.2 64.3	1.64 1.50	2 10	1829.6	98.7	1.58
2,319	Ho. 332	4 38 26	+20 31	9 , 9	1909.7	124.7	1.17	3	1891.1	125.9	1.03
13,009	A. 1013	4 38 32	+59 26	7.2, 7.2	1914.2	319.2	0.47	1	1905.6	311.1	0.46
2,320	Ho. 333	4 38 41	+20 6	9 , 9.3	1907.4 11.6	160.5 158.3	2.43 2.44	5 9	1891.1	161.6	1.71
2,316	Σ 582	4 38 46	+42 17	7.3, 10.0	1904.2	22.5	5.57	1	1831.4	23.9	5.54
* 2,336	Σ 589	4 40 50	+ 5 9	8.0, 8.0	1911.0	293.9	4.39	1	1831.4	310.9	4.47
* 2,381	β 883	4 47 2	+10 57	7.0, 7.0	1897.00 97.31 98.08 99.08 1900.12 01.10 02.00 03.05 04.04 10.07 13.04 14.06 15.22	25.5 39.6 37.7 49.9 61.6 60.0 73.2 90.9 105.8 341.2 25.2 33.4 50.3	.. 0.38 0.13 0.36 0.27 0.30 0.33 0.24 .. 0.26 0.33 0.20 0.29	1 1 7 7 12 5 5 3 1 3 4 1 2	1879.0	17.5	0.35
	AB, C			14	1898.3 1904.4	154.8 158.3	18.12 17.75	3 3	1879.0	148.5	18.35
* 2,383	β 552	4 47 35	+13 32	7 , 10	1898.0 99.2 1900.2 09.2	191.0 206.1 207.9 231.0	0.42 0.37 0.45 0.48	2 1 2 1	1878.0	360±	0.8±
2,385	Σ 603	4 48 29	+49 28	8.0, 8.2	1904.2	238.4	8.33	1	1830.2	238.6	8.42
2,433	β 1045	4 53 16	+23 50	6.0, 12.3	1911.1	8.6	6.26	1	1889.1	6.2	6.30
2,439	Σ 620	4 54 5	+13 50	8.4, 9.4	1911.2	233.9	3.85	8	1831.1	226.3	3.59

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"		Date.	°	"
2,435	Σ 616	4 54 9	+37 47	4.0, 7.9	1904.2	353.9	5.77	2	1828.8	351.9	6.46
* 2,443	Σ 622	4 54 11	+ 1 33	8.2, 8.2	1910.5	170.0	2.15	4	1832.1	179.9	2.64
2,441	Ho. 17	4 54 32	+30 54	8, 10	1905.6	56.4	4.23	4	1882.1	52.2	4.38
2,444	Ho. 222	4 54 46	+31 28	7.7, 10.5	1905.5	221.2	1.99	2	1887.0	222.6	1.89
* 2,445	ΟΣ 92	4 55 8	+39 17	6.0, 9.7	1893.2 1903.2 10.5	253.4 253.0 257.4	2.01 2.99 3.19	2 1 4	1849.1	230.1	2.78
* 2,446	Σ 619	4 55 32	+50 9	8.7, 8.7	1914.2	126.8	4.48	1	1830.2	106.0	5.41
* 2,464	ΟΣ 93	4 56 30	+ 4 59	7.5, 9.0	1900.2 04.0 11.2	51.3 43.4 37.6	0.74 0.64 0.61	2 1 1	1847.2	65.6	1.37
2,462	β 1238	4 56 40	+26 25	8.1, 11.3	1906.7	11.0	1.45	5	1891.8	12.6	1.42
* 2,466	Δ 6	4 56 42	+14 24	8.8, 9.2	1911.4	93.1	0.92	10	1874.9	84.7	0.93
2,472	Hu. 445	4 57 19	+20 43	8.5, 8.8	1904.2	290.4	0.47	1	1901.9	278.4	0.41
2,465	Σ 625	4 58 2	+58 45	8.2, 9.8	1904.2	113.7	4.78	1	1831.2	114.7	4.44
2,491	Ho. 224	5 0 0	+28 37	9.0, 10.7	1907.8	287.4	1.73	6	1887.0	278.2	1.82
13,030	A. 1024	5 0 58	+29 31	8.1, 8.9	1909.8	353.5	0.64	5	1905.0	354.8	0.48
* 2,509	ΟΣ 95	5 1 7	+19 42	6.6, 7.2	1910.4	321.6	0.78	17	1846.0	344.2	0.55
13,034	A. 1026	5 1 28	+29 54	7.8, 11.0	1907.4	38.4	1.06	2	1905.0	41.6	1.01
2,523	Hu. 446	5 2 51	+22 38	9.2, 9.8	1907.2	183.8	1.01	3	1901.9	183.0	0.90
13,038	A. 1028	5 3 30	+30 0	8.5, 9.1	1907.9	238.6	0.45	1	1905.1	244.2	0.42
* 2,535	ΟΣ 98	5 3 47	+ 8 24	6.0, 6.8	1896.3 1902.2 12.4	183.2 171.9 153.4	0.94 0.80 0.88	10 9 11	1844.5	250.8	1.14
2,536	Σ 643	5 3 49	+ 8 19	8.5, 8.5	1910.2	299.3	2.56	6	1831.8	295.2	2.68
* 2,544	Σ 645	5 5 2	+27 57	6.2, 8.2	1902.6	25.4	11.78	9	1829.9	26.8	11.71
	BC=β 1047			8.7, 9.2	1901.51	54.8	0.40	6	1889.1	75.3	0.44
2,543	Σ 644	5 5 13	+37 13	6.7, 7.0	1909.9	219.4	1.61	5	1828.6	219.2	1.61
2,554	ΟΣ 100	5 6 0	+ 8 5	7.0, 9.8	1898.1	251.2	4.29	1	1848.5	247.2	4.32
2,551	Σ 648	5 6 9	+31 57	7.4, 8.1	1911.1	70.2	4.74	5	1831.2	74.3	4.68
2,565	β 885	5 7 9	- 1 51	8.3, 8.4	1900.7 10.1	205.5 192.3	0.56 0.58	2 2	1880.8	196.1	0.71
2,571	Hu. 33	5 7 50	+ 0 26	7.5, 8.0	1914.2	325.1	0.45	1	1899.1	324.2	0.16
2,576	β 1006	5 8 33	- 2 18	9.6, 11.0	1900.2	204.1	0.51	1	1882.0	201.7	0.78
* 2,588	ΟΣ 517	5 9 38	+ 1 52	6.5, 6.7	1910.08 1914.20	296.8 318.2	0.24 0.39	2 1	1854.9	279.8	0.63

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
2,605	β 555 BC.	h m s	° ' "			°	"			°	"
		5 10 57	+ 8 23		1901.04 02.01	179.3 158.4	0.36 0.44	1 1	1878.1	172.8	0.35
	Λ, BC=Σ 668			1.0, 8.0	1901.5	200.7	9.88	2	1831.5	199.8	9.14
2,604	Σ 665	5 11 18	+19 39	8.3, 9.2	1908.6	257.0	1.72	4	1831.1	260.1	1.80
2,603	Σ 662	5 11 22	+25 59	7.9, 11.0	1904.2	102.9	5.57	1	1831.1	102.2	5.29
* 2,613	Σ 670	5 12 21	+18 21	7.7, 8.2	1910.7	165.6	2.40	6	1830.5	171.1	2.33
* 2,609	Σ 657	5 12 27	+52 46	7.5, 8.0	1914.2	288.6	1.20	2	1835.9	273.2	1.42
2,625	Σ 674	5 12 59	+20 3	6.5, 9.5	1904.2	148.6	9.93	2	1828.2	147.3	10.55
2,624	Ho. 334	5 13 1	+22 39	8.1, 10.2	1909.5	182.6	1.98	5	1893.2	186.8	1.76
2,623	OΣ 103	5 13 14	+33 18	5.2, 11.0	1904.2	57.6	4.22	1	1848.0	56.5	4.49
2,618	Σ 669	5 13 26	+45 10	7.8, 8.3	1904.2	275.9	9.83	1	1831.2	275.5	9.74
13,048	Λ. 844	5 13 40	- 1 42	8.8, 9.1	1914.2	355.8	0.40	1	1904.9	350.7	0.22
2,634	Σ 678	5 13 41	+ 4 36	8.3, 8.8	1911.5	98.6	3.40	6	1830.8	96.5	3.28
2,644	Σ 680	5 14 49	+20 3	6.3, 10.2	1904.2	204.9	8.54	1	1827.9	201.8	8.72
2,650	Σ 683	5 15 41	+25 5	7.8, 10.0	1904.2	77.9	12.36	1	1827.8	80.1	12.13
2,669	CD=β 886	5 17 22	+33 44	8.5, 10.0	1901.1	253.7	0.84	9	1882.2	246.9	0.90
	Σ 687 AB			8.2, 9.0	1900.7	68.9	17.40	7	1829.2	67.6	17.17
	Σ 687 AC			9.2	1899.2	153.5	48.78	2	1829.2	153.5	48.73
2,676	OΣ 105=Ho. 225	5 17 28	+12 37	7.8, 7.8	1900.9 06.0	107.3 114.2	0.48 0.50	6 6	1848.2	110.0	0.72
2,673	β 190	5 16 55	- 8 6	7.9, 8.7	1910.1	354.8	0.44	1	1876.2	355.3	0.71
2,672	β 887 AB	5 17 29	+33 21	9.0, 10.5	1901.9	190.2	1.06	6	1882.2	194.3	1.00
	AC			13.5	1902.6	113.6	9.50	5	1898.8	112.8	9.54
	AD			12.0	1901.9	332.7	10.63	6	1882.2	332.8	10.56
	AE			13.5	1902.7	200.9	15.10	2	1898.8	201.6	14.80
	AF			12.5	1903.1	351.6	38.18	1			
	FG			12.5, 13.5	1906.1	4.3	2.66	2			
2,690	β 888	5 19 33	+37 19	6.0, 12.0	1904.2	170.3	8.60	1	1880.1	171.0	7.91
* 2,706	Wn. 2	5 20 0	- 0 56	6.5, 6.8	1913.7	163.4	2.30	2	1866.5	169.8	1.64
13,055	Λ. 847	5 20 3	- 0 59	8.0, 8.1	1914.2	143.2	0.36	1	1904.9	141.5	0.25
* 2,712	Da. 5	5 20 44	- 2 27	4, 5	1899.4	80.0	1.03	6	1849.3	87.2	0.98
2,713	Σ 706	5 21 29	+30 18	8.2, 9.3	1908.9	40.4	3.68	6	1829.2	36.8	3.65
13,059	Λ. 848	5 21 42	- 0 39	7.5, 8.1	1910.1	43.2	0.26	1	1904.9	35.6	0.22

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
2,721	Ho. 226	5 22 16	+27 33	7, 7	1906.0 10.6	238.5 238.7	0.63 0.65	11 10	1887.1	230.2	0.50
	AB, C			10.5	1906.1	273.6	23.57	3			
* 2,731	Σ 712	5 22 35	+ 2 53	7.0, 9.0	1914.1	55.0	2.64	3	1831.2	45.4	3.08
2,724	Lewis 6	5 22 38	+34 42	8, 11	1899.1	302.5	2.30	1			
2,735	Knott 3	5 22 54	+ 3 2	5.5, 11.1	1914.2	314.9	2.54	1	1864.1	322.0	2.78
2,728	β 889	5 23 8	+34 22	8.5, 10.0	1901.5	225.2	0.88	6	1878.9	223.5	1.11
	AC			14.1	1899.9	102.1	3.85	3	1891.9	102.6	3.76
	AD			13.8	1899.9	109.0	11.81	3	1891.9	108.0	12.04
	AE= Σ 707			10.2	1902.0	132.5	18.33	5	1830.8	131.6	18.29
	AF			11.5	1906.2	193.3	27.86	2	1878.9	200.7	27.77
13,061	A. 1035	5 24 34	+31 22	8.5, 10.5	1910.7	119.7	1.25	2	1905.1	120.0	0.98
* 2,751	Σ 716	5 24 39	+25 6	5.8, 6.6	1912.3	201.3	4.76	13	1829.6	196.8	4.89
2,746	Hu. 217	5 24 42	+35 19	7.0, 8.5	1908.5	261.6	0.52	3	1900.9	257.1	0.56
2,748	Σ 715	5 24 55	+41 14	8.2, 8.9	1904.2	200.1	0.63	1	1831.5	206.0	0.95
	AC			11.5	1904.2	51.0	19.45	1			
13,062	A. 849	5 25 8	- 1 50	9.0, 10.2	1914.2	95.8	0.65	1	1904.8	94.1	0.68
2,758	Σ 719	5 25 18	+29 29	7.0, 9.5	1901.7 09.3	327.6 328.0	1.02 1.08	11 6	1833.5	326.5	0.68
	AC			8.9	1903.0	350.4	15.13	10	1833.5	351.5	14.83
2,770	Σ 718	5 26 33	+49 20	7.2, 7.2	1904.2	78.3	7.97	1	1829.9	74.2	7.78
2,779	Σ 726	5 26 42	+10 12	8.0, 8.5	1911.4	259.5	1.13	7	1831.8	261.0	1.21
* 2,780	Σ 728	5 26 46	+ 5 53	5.2, 6.7	1896.1 1900.2 03.2 10.2 13.1 15.2	176.3 188.8 132.0 133.5 114.4 262.3	0.32 0.38 0.23 0.16 0.18 0.24	1 2 1 1 2 2	1831.0	203.7	1.04
* 2,790	Σ 731	5 27 34	+ 2 13	8.5, 9.0	1910.1	327.8	4.87	2	1831.5	331.6	4.61
2,791	Ho. 335	5 28 6	+26 43	9, 10.5	1908.6	116.0	3.23	4	1891.1	115.7	2.80
2,804	β 1048	5 28 53	- 1 39	6.2, 10.7	1911.6	0.5	1.53	2	1889.1	358.2	2.20
2,808	CD= β 1049	5 29 19	- 1 46	8.7, 9.7	1909.7	300.0	0.73	2	1888.9	296.1	0.76
	AB= Σ 734			7.0, 8.6	1910.1	355.8	1.65	5	1832.9	356.4	1.78
	AC			8.6	1909.1	243.1	29.95	1	1832.5	243.1	29.29
* 2,812	β 1267	5 30 16	+30 53	8.5, 8.5	1910.3	212.1	0.73	6	1892.1	217.9	0.84
13,068	Hu. 1108	5 31 12	+44 53	9.5, 9.7	1910.8	147.4	1.24	1	1905.1	150.6	1.37

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"			°	"
2,843	Σ 752	5 31 46	- 5 57	3.2, 7.3	1909.1	140.0	11.06	1	1831.9	142.2	11.32
2,842	Σ 750	5 31 48	- 4 25	6.0, 8.0	1913.2	60.8	4.59	1	1831.2	59.2	4.29
* 2,826	Σ 736	5.31 51	+41 47	7.2, 8.5	1912.7	351.5	2.28	7	1830.9	342.4	2.02
* 2,835	Σ 742	5 31 56	+21 57	7.2, 7.8	1893.2 1910.7	258.7 261.8	3.44 3.42	2 11	1837.1	251.1	3.32
* 2,845	Σ 749	5 32 28	+26 53	7.1, 7.2	1897.3 1904.4 12.9	352.0 350.2 344.7	0.86 0.84 0.82	15 28 9	1829.5	23.4	0.67
* 2,857	β 1240	5 33 49	+30 27	5.6, 6.0	1899.2 1901.0 02.7 08.1 10.1 14.1 15.2	347.0 337.1 326.6 321.8 319.9 308.3 294.6	0.22 0.21 0.22 0.12 0.20 0.20 0.22	2 5 6 1 5 2 2	1892.0	344.4	0.15
	AC=Σ 753			5.8, 8.0	1900.9 11.4	268.1 268.3	12.49 12.37	7 5	1828.6	268.0	12.34
2,873	Σ 757	5 34 16	- 0 13	8.0, 8.2	1914.2	235.6	1.53	1	1831.2	239.8	1.68
* 2,866	OΣ 112	5 34 46	+37 55	7.3, 8.0	1900.5 10.0	71.1 68.1	0.58 0.64	15 7	1848.6	85.2	0.64
* 2,883	β 1032	5 34 58	- 2 38	4.0, 6.0	1902.2 10.2	330.2 326.1	0.27 0.20	2 1	1888.8	357.0	0.26
2,874	Hu. 825	5 35 2	+35 58	8.0, 8.2	1909.4	336.7	0.29	5	1902.8	343.1	0.27
* 2,896	β 1007	5 36 57	+16 30	6.0, 6.2	1900.22 02.20 03.14 10.14 12.13 15.22	254.7 254.2 253.7 271.3 260.9 264.4	0.20 0.23 0.21 0.20 0.19 0.19	2 2 2 3 1 2	1881.3	266.2	0.27
* 2,902	Σ 774	5 36 58	- 1 58	2.0, 5.7	1894.0 1900.2 13.2	152.0 155.7 158.8	2.78 2.41 2.42	1 2 1	1836.2	151.3	2.55
	AC			(10)	1913.2	9.8	57.61	1	1781.8	7.0	60±
2,898	Σ 770	5 37 9	+19 11	8.5, 10.2	1911.0	334.1	1.25	2	1830.5	341.1	1.28
2,920	Σ 778	5 39 14	+30 55	7.7, 9.0	1904.2	184.0	3.09	1	1828.6	185.8	3.22
2,927	Σ 783	5 39 52	+29 0	8.0, 9.7	1904.2	353.7	9.65	1	1831.3	358.8	9.81
13,076	A. 1040	5 39 52	+31 16	8.2, 9.3	1909.4	131.5	0.70	4	1905.5	130.7	0.69
2,936	OΣ 115	5 40 14	+15 2	7.1, 7.9	1908.6	116.9	0.71	2	1847.8	123.1	0.76
2,930	Ho. 510	5 40 17	+33 41	9.0, 9.2	1906.3	241.2	1.31	1	1897.1	243.9	1.12
2,937	Hu. 38	5 40 26	+22 52	8.6, 8.8	1907.6	141.6	0.47	9	1900.0	145.5	0.51
2,945	Σ 787	5 41 31	+21 17	8.1, 8.5	1910.9	72.1	1.10	12	1832.9	78.5	1.38
2,946	Σ 786	5 41 32	+20 13	7.7, 10.7	1909.3	334.9	6.19	5	1832.5	335.8	5.99

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
2,956	Hu. 39	h m s	° ′			°	"			°	"
2,961	β 91	5 42 41	+21 51	8.4, 8.5	1906.3	65.5	0.43	1	1900.1	43.2	0.30
* 2,975	OΣ 119	5 43 9	+20 55	7.5, 10.0	1899.9	90.6	1.43	1	1875.3	82.0	1.57
2,972	OΣ 118	5 43 51	+ 7 56	7.5, 8.3	1902.1	320.8	0.59	2	1848.6	303.9	0.64
* 2,976	Σ 795	5 43 54	+20 51	6.2, 7.7	1900.5 11.7	312.2 315.4	0.59 0.58	17 9	1854.2	318.7	0.56
* 2,977	β 560	5 43 57	+ 6 26	6.2, 6.2	1912.0	207.3	1.28	9	1831.2	200.1	1.75
	† Lewis	5 44 30	+29 42	8.0, 8.0	1895.06 98.60 99.04 1901.10 02.62	155.3 163.3 160.6 166.6 153.3	0.52 0.69 0.64 0.69 0.71	1 2 2 2 2	1877.9	208.2	0.94
2,978	Σ 791	5 44 6	+29 43	8.8, 9.8	1903.2 11.6	165.0 170.8	3.93 3.28	2 2			
3,009	Hu. 40	5 44 50	+39 33	8.7, 9.3	1913.7	91.6	4.92	4	1830.2	90.2	4.86
* 3,003	Σ 799	5 46 51	+20 7	8.5, 9.5	1906.3	8.0	3.29	1	1900.1	10.2	3.61
3,006	Σ 802	5 47 3	+38 33	7.2, 8.3	1900.0 12.6	180.8 175.9	0.84 0.99	17 9	1829.9	192.5	1.06
3,013	Ku. 24	5 47 15	+40 8	7.9, 8.5	1912.0	106.9	2.81	6	1828.8	108.7	3.22
3,031	Σ 811	5 47 46	+50 10	9.4, 10.0	1914.2	268.4	1.56	1	1901.6	258.5	1.43
3,033	OΣ 123	5 49 26	+30 29	8.0, 9.5	1909.1	230.8	5.14	1	1829.2	229.9	5.08
3,038	Ho. 20	5 50 1	+10 14	7.0, 8.7	1910.9	178.1	2.06	11	1846.8	175.9	2.41
* 3,035	OΣ 122	5 50 39	+14 13	7, 12	1906.1	277.4	7.99	2	1886.2	276.8	7.82
3,047	Σ 816	5 50 45	+36 56	7.3, 8.0	1909.1	145.5	0.30	1	1847.7	108.9	0.36
3,045	Ho. 337	5 50 54	+ 5 51	6.2, 8.7	1911.1	287.0	4.20	2	1830.1	289.3	4.25
	BC	5 51 11	+23 16	9, 10	1908.1	114.9	9.47	7	1820+	120±	8±
3,059	Perrine			9.0, 9.2	1908.5	107.3	1.18	6	1890.2	101.0	0.91
* 3,065	Σ 821	5 53 14	+52 42	9.0, 9.3	1900.3	307.1	1.92	1	1898.8	307.1	1.86
* 3,085	Σ 826	5 53 37	+29 38	8.0, 9.8	1909.6	4.8	2.12	9	1830.2	12.3	2.17
3,089	Ho. 21	5 55 6	- 1 20	8.2, 9.2	1899.1 1912.0	123.3 122.1	2.05 1.75	2 1	1832.4	115.5	1.84
3,097	H 717	5 56 18	+27 34	6.7, 13	1907.1	238.7	10.06	2	1884.7	238.4	9.81
3,106	Barnard 4	5 57 25	+34 15	9-10, 12	1905.0	38.0	9.56	1	1820+	45±	9±
	AC	5 58 17	+22 17	9.0, 9.3	1910.5	190.2	1.76	8	1900.8	193.4	1.91
3,129	Σ 835			13.5	1910.1	14.3	4.19	2	1900.8	13	4.84
		6 0 35	+18 19	8.0, 9.0	1909.1	144.4	2.11	3	1830.9	146.6	2.24

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
3,141	Ho. 228	h m s 6 1 48	° ' " +12 29	8.0, 11.0	1905.6	° 270.7	" 2.43	4	1887.1	° 264.9	" 1.81
3,144	A.G. 105	6 2 15	+20 7	8.7, 10	1905.1	189.7	1.42	2	1902.2	199.0	1.51
* 3,146	Σ 840 BC	6 2 19	+10 46	8.5, 8.7	1907.9	173.1	0.57	1	1830.9	183.5	0.91
3,142	OΣ 131	6 2 21	+36 17	7.0, 10.2	1910.8	282.3	1.38	5	1847.2	274.9	1.47
* 3,148	OΣ 132	6 3 3	+38 0	6.8, 10.0	1910.9	317.5	1.70	6	1847.2	313.9	1.58
* 3,174	Σ 851	6 4 7	+ 3 18	8.2, 8.7	1910.7	29.2	2.64	3	1831.5	26.4	2.89
3,172	Σ 849	6 4 22	+17 25	8.5, 8.9	1910.1	245.8	0.81	4	1832.2	244.1	0.91
3,178	A. 54	6 4 58	+29 15	7.5, 8.8	1901.9	348.6	0.54	3	1900.2	344.6	0.53
	AC				1901.3	312.1	51.86	1			
3,182	β 1241	6 5 11	+23 8	5.9, 10.0	1900.2	337.5	0.43	2	1891.8	344.7	0.53
	AC			14.5	1903.2	63.1	17.85	1	1891.9	63.3	18.36
* 3,191	β 1058	6 5 57	+23 1	7.2, 7.5	1900.8 12.6	275.6 268.6	0.30 0.28	10 18	1889.1	284.3	0.41
3,201	A. 55	6 6 55	+28 48	8.7, 9.3	1903.2	288.1	0.58	1	1900.2	288.8	0.49
3,204	Σ 867	6 7 17	+17 24	7.0, 8.5	1904.2	154.3	2.13	1	1831.2	156.3	2.24
3,220	A. Clark 3	6 8 0	- 4 38	6.5, 9.0	1915.0	175.3	1.40	1	1854.2	173.6	1.11
3,215	A.G. 107	6 8 13	+24 27	9.0, 9.2	1909.1	176.0	1.25	7	1902.5	181.0	1.85
3,217	A. 56	6 8 31	+29 4	8.1, 11.8	1902.7	54.2	1.32	2	1900.2	48.0	1.03
3,227	Σ 875	6 8 41	-13 7	8.7, 9.8	1915.0	326.9	5.17	1	1830.8	334.9	6.05
3,230	Ho. 22	6 9 18	+10 17	8.0, 8.0	1906.1	198.1	0.72	2	1886.2	195.1	0.63
3,235	Ho. 23	6 9 57	+14 32	8.2, 12.0	1907.2	243.9	2.74	1	1884.7	248.6	2.76
3,233	Lewis 7	6 10	+22 36	9 , 10	1900.2 10.7	87.6 84.5	2.99 3.12	1 2			
* 3,239	β 1008	6 10 22	+22 32	3 , 8.8	1900.2	296.6	0.88	1	1882.1	301.4	0.96
3,242	Σ 877	6 10 25	+14 37	7.2, 7.7	1909.0	262.9	5.63	7	1829.6	263.3	5.32
3,279	Ho. 24	6 13 58	+ 9 21	8.0, 11.5	1905.2	156.0	4.22	1	1884.7	156.0	4.60
3,290	Ho. 230	6 14 38	+13 49	8.3, 10.5	1905.8	60.5	1.90	6	1887.1	52.0	1.20
* 3,291	β 895	6 15 13	+28 28	7.5, 7.5	1900.9 10.2 †11.2 13.0 14.1	162.6 169.4 190.1 189.3	0.27 0.16 0.28 0.28	7 3 1 1	1879.2	133.3	0.27
	AB, C= Σ 888			9.2	1901.4 12.3	252.4 254.4	2.88 2.79	12 13	1831.2	246.2	2.70

† Possibly elongated 206°, < .1°.

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
3,295	H. 385	h m s 6 15 13	° ' " +22 9	8.7, 9.4	1907.5	° 49.7	" 1.72	6	1903.7	° 51.0	" 1.45
	AC			14.2	1909.6	51.9	6.14	2	1903.8	55.0	5.78
	AD			12.5	1909.6	289.3	9.05	2	1903.7	291.5	9.09
	AE			11.9	1909.6	58.8	16.51	2	1903.7	59.6	16.39
3,296	Hu. 452	6 15 15	+22 20	9.0, 10.0	1910.2	342.2	2.42	1	1902.1	341.4	2.56
	† Lewis	6 16 47	+22 3	8, 9	1910.2	311.5	5.82	1			
* 3,277	Σ 881	6 15 24	+59 24	6.4, 7.9	1900.9 14.2	105.8 111.9	0.69 0.84	3 1	1830.3	89.0	0.81
* 3,313	S. 513	6 16 46	+21 10	8, 9.5	1914.4	258.1	60.07	1	1825.1	257.2	58.91
	BC			10	1914.4	86.5	15.12	1	1843.2	66.8	16.28
	BD				1914.4	325.4	42.14	1			
3,324	Ho. 232	6 17 28	+14 43	9.5, 11.0	1905.7	355.0	2.67	2	1890.1	343.7	2.03
3,326	Ho. 25	6 17 43	+25 16	9, 9	1904.8	246.6	0.79	5	1886.2	236.2	0.3±
3,328	Σ 898	6 17 48	+11 1	8.3, 8.8	1904.3	122.6	6.19	1	1828.5	121.0	6.05
3,333	Σ 899	6 18 27	+17 37	7.0, 8.0	1902.2	20.1	2.27	15	1831.2	20.3	2.38
3,331	β 1020	6 18 36	+28 48	8.2, 10.0	1900.1	158.1	1.06	6	1891.2	158.5	1.27
3,337	Ho. 233	6 18 50	+16 34	8.2, 11	1905.5	38.1	2.14	5	1887.1	37.1	1.67
3,341	Hu. 702	6 19 39	+34 26	8.5, 9.0	1908.8	321.4	0.86	7	1902.8	323.6	0.96
3,372	O Σ 140	6 22 20	+15 34	7.0, 9.5	1911.3	118.2	2.76	13	1847.2	123.4	2.79
3,374	A.G. 112	6 22 54	+24 35	9.0, 9.1	1909.8	208.2	2.89	10	1902.5	208.8	2.50
* 3,379	Σ 905	6 23 40	+40 11	8.0, 10.0	1912.2	127.7	2.25	1	1833.1	117.4	1.83
3,396	Σ 915	6 24 13	+ 5 20	8.0, 9.0	1908.6	41.5	6.01	4	1833.5	39.2	5.91
3,398	A.G. 114	6 24 19	+ 8 37	9.2, 10.0	1909.2	0.7	4.85	3	1894.1	359.5	5.39
3,397	β 1192	6 24 30	+20 16	8.7, 8.8	1900.2	340.6	0.16	1	1890.9	346.2	0.15
3,392	Σ 912	6 24 41	+36 40	8.2, 10.2	1910.2	25.4	3.40	3	1830.6	27.3	3.33
* 3,402	Σ 919	6 25 11	- 6 59	5.0, 5.5	1898.9 1911.1	132.4 132.8	7.29 7.20	1 2	1831.2	130.0	7.25
	BC			6.0	1898.9 1911.1	102.8 106.1	2.93 2.47	1 2	1831.2	101.7	2.46
3,399	A.G. 115	6 25 29	+30 29	8.8, 9.1	1909.1	354.9	4.19	2	1902.8	353.3	3.97
3,405	O Σ 141	6 25 39	+17 57	7.5, 9.6	1907.1	138.0	2.15	4	1848.9	142.4	2.30
3,409	Ho. 340	6 26 3	+18 0	7.2, 13.0	1906.1	22.0	6.58	2	1891.7	24.2	6.40
3,416	β 896	6 26 44	+32 13	7.0, 10.0	1909.3	206.2	1.02	1	1879.0	199.3	0.89
	AC			13.0	1909.3	212.3	18.67	1	1879.6	210.8	18.44

† Identified in *Oxford Astrographic Catalogue*.

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
3,420	β 1021	h m s 6 26 59	° ' " +28 26	8.1, 9.4	1901.4 10.5	° 84.9 88.3	" 0.71 0.72	11 5	1892.2	° 86.0	" 0.68
*3,423	Σ 918	6 27 57	+52 31	6.7, 7.7	1914.2	330.1	4.41	2	1829.3	322.4	4.45
3,437	O Σ 145	6 28 2	+15 45	7.0, 9.8	1910.1	338.2	1.51	2	1846.8	338.7	2.03
3,449	Σ 928	6 29 32	+38 36	7.4, 8.0	1910.2	132.2	3.25	3	1830.0	134.4	3.40
3,456	O Σ 148	6 30 0	+37 7	7.1, 10.8	1910.2	73.1	2.58	1	1849.2	77.1	2.54
*3,460	Σ 932	6 30 5	+14 49	8.2, 8.3	1899.7 1911.6	327.0 323.6	2.12 1.94	13 13	1830.5	341.7	2.43
3,457	Σ 929	6 30 14	+37 47	7.1, 8.2	1904.2	25.5	6.34	2	1830.5	24.6	6.02
3,467	β 194	6 31 9	+38 3	8.0, 8.5	1911.0	283.1	1.05	8	1875.4	285.0	0.91
*3,474	O Σ 149	6 31 44	+27 21	6.5, 9.0	1897.3 1902.6 10.2	280.6 274.6 269.9	0.73 0.70 0.64	7 12 10	1848.2	350.7	0.53
3,473	A.G. 116	6 31 50	+38 17	8.8, 9.1	1911.4	25.9	2.38	5	1902.8	28.2	2.15
3,492	Σ 942	6 33 7	+23 43	9.0, 9.2	1907.7	245.1	3.57	4	1830.9	244.1	3.29
*3,484	Σ 936	6 33 13	+58 10	7.0, 8.7	1899.7 1914.2	267.2 271.3	1.59 1.46	5 2	1831.6	254.9	1.61
3,490	Σ 941	6 33 22	+41 39	7.0, 8.0	1910.2	81.4	1.84	2	1830.3	77.6	1.95
3,518	O Σ 152	6 34 50	+28 20	6.0, 7.8	1912.7	33.2	0.85	9	1850.0	40.2	0.86
*3,515	Σ 945	6 35 5	+41 3	7.1, 8.0	1893.2 1901.6 10.6	269.0 268.5 274.1	0.69 0.77 0.68	2 11 5	1830.8	249.0	1.06
13,106	A. 1053	6 35 50	+25 9	8.8, 10.2	1912.3	340.8	0.79	1	1905.5	346.4	1.00
3,536	Ho. 236	6 36 35	+20 43	7.2, 13	1906.3	203.9	17.57	2	1890.1	202.5	17.34
*3,542	Σ 950	6 36 51	+9 58	6.0, 8.8	1910.3	213.0	2.83	5	1831.8	208.6	2.76
	AC			11.2	1911.2	13.9	16.65	2	1831.5	12.9	16.58
	AD			11	1911.3	307.9	40.57	1	1841.2	307.1	40.
	AE			9.1	1911.3	138.8	73.85	1	1874.4	139.2	74.21
3,545	Σ 949	6 36 54	+5 47	8.5, 9.0	1910.2	288.5	3.31	2	1831.9	287.7	3.40
3,543	Δ 11	6 36 55	+9 59	9.1, 9.2	1910.3	45.9	3.87	5	1869.8	45.9	3.65
3,548	Σ 953	6 37 3	+9 4	7.5, 8.0	1904.3	330.1	7.27	1	1832.2	330.9	7.09
3,549	Σ 3117	6 37 15	+9 49	8.9, 9.4	1908.3	91.1	0.73	5	1832.7	93.2	0.60
3,552	Σ 3118	6 37 22	+9 54	9.0, 9.5	1911.1	170.9	2.55	8	1831.2	174.8	2.43
3,541	Σ 946	6 38 14	+59 32	7.2, 9.0	1905.8	129.6	4.01	3	1830.6	133.5	4.20
3,557	Σ 955	6 39 36	+30 55	8.7, 9.0	1915.0	273.4	1.31	1	1830.7	272.6	0.88
	AC			8.5	1915.0	189.5	11.64	1	1831.4	188.4	11.44

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*3,559	Σ 948	h m s	° ′	.		°	"			°	"
		6 39 37	+59 32	5.2, 6.1	1901.0 13.9	117.9 113.1	1.55 1.63	8 3	1831.1	153.7	1.53
	AC			7.4	1901.1 13.9	305.8 307.1	8.67 8.56	6 3	1831.1	304.2	8.67
3,576	A.G. 119	6 40 5	+23 32	8.5, 9.0	1906.9	77.7	1.63	4	1902.2	76.8	1.50
3,580	Σ 957	6 40 21	+30 55	7.5, 9.0	1909.6	92.8	3.55	4	1831.6	95.6	3.42
*3,596	A. G. Clark 1	6 41 54	-16 36	-1.6, 1.0	1898.21 1904.19 13.14	179.2 112.9 82.6	4.68 5.82 10.03	1 1 1	1862.19	84.6	10.07
3,587	Σ 958	6 41 56	+55 47	6.0, 6.0	1904.2	258.1	4.91	1	1830.9	256.7	5.07
3,593	Ho. 238	6 41 58	+18 17	8.5, 8.5	1905.6	186.6	0.43	5	1887.2	185.8	0.45
*3,601	OΣ 156	6 43 1	+18 16	6.5, 7.0	1901.5 11.7	300.5 293.4	0.56 0.47	22 15	1845.0	342.5	0.42
*3,615	OΣ 157	6 43 57	+ 0 25	7.5, 8.0	1914.2	339.1	0.68	1	1847.7	7.5	0.71
3,616	Σ 964	6 44 10	+43 50	8.3, 9.0	1904.2	193.2	1.83	1	1831.3	195.5	1.69
3,630	Ho. 239	6 45 42	+14 47	8.0, 8.5	1906.9	133.0	0.53	4	1887.2	132.9	0.36
*3,625	Σ 963	6 46 28	+59 32	5.9, 7.1	1899.9	74.5	0.47	4	1830.9	51.5	0.90
3,651	Ho. 26	6 47 24	+20 25	8.5, 12.0	1906.8	202.1	5.53	3	1882.7	200.8	5.06
3,670	Σ 977	6 49 46	+48 40	8.0, 9.5	1912.3	128.4	2.05	1	1831.9	128.7	1.70
3,681	OΣ 160	6 49 52	+21 16	6.8, 9.8	1901.4 10.1	173.1 170.7	1.31 1.47	9 3	1848.2	167.1	1.26
*3,692	Σ 982	6 50 24	+13 17	5.4, 7.7	1893.2 1913.4	160.7 156.9	6.77 6.42	2 9	1829.2	174.9	5.73
3,690	OΣ 161 rej.	6 50 27	+30 16	6.5, 10.8	1906.2	169.9	20.47	1	1868.1	172.0	19.65
*3,689	Σ 981	6 50 38	+30 16	8.0, 8.0	1912.4	144.4	2.72	15	1831.3	149.3	3.67
3,700	Σ 986	6 50 47	+ 9 36	8.3, 8.8	1904.3	165.2	5.30	1	1828.2	167.2	5.20
*3,678	OΣ 159	6 50 48	+58 32	5.1, 6.2	1914.3	22.2	0.60	2	1844.0	323.4	0.53
3,707	Ho. 27	6 51 38	+20 12	9 , 9	1906.0	125.7	3.27	2	1882.2	126.2	3.01
3,715	β 326	6 52 17	+ 2 25	8.0, 9.5	1914.2	58.0	0.76	1	1876.8	62.8	1.25
*3,710	Σ 991	6 52 26	+25 4	8.0, 9.0	1908.2	167.0	3.67	5	1830.5	172.4	3.79
3,717	Ho. 28	6 52 48	+27 5	9.5, 9.5	1906.5	256.7	6.37	3	1886.2	256.8	5.37
*3,728	Σ 998	6 53 12	- 5 22	8.2, 8.5	1915.1	211.3	2.95	1	1831.5	205.5	3.14
3,746	β 327	6 54 43	- 2 55	7.5, 8.0	1903.1 11.2	100.0 91.7	0.64 0.56	2 2	1876.8	100.8	0.96
{ 13,117	A. 1061 AB	6 54 45	+25 21	8.2, 8.5	1907.2	321.3	0.40	2	1904.9	313.8	0.27
{ 3,739	AB, C=Σ 1000			8.7	1907.2	67.2	22.26	2	1829.7	66.9	22.40

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
3,743	β 899	6 54 47	+18 50	9.0, 9.0	1898.9 1906.5	268.5 268.8	0.62 0.62	5 3	1879.1	261.4	0.68
	AC			10	1907.2	174.6	24.17	2	1879.1	174.2	24.07
	AD			9	1907.2	47.6	40.74	2	1879.1	48.1	40.46
*3,755	β 1022	6 56 4	+27 23	8.5, 8.5	1911.2	121.7	0.38	4	1899.0	133.8	0.48
3,763	Σ 1008	6 56 57	+26 42	8.0, 10.0	1904.3	272.6	2.53	2	1830.9	270.2	2.38
3,757	Σ 1001	6 57 1	+54 18	7.1, 8.7	1904.3	64.6	9.05	1	1831.5	64.0	8.90
	BC			9.0	1904.3	357.0	1.45	1	1831.5	354.8	1.65
	†Espin 289	6 57 37	+39 4	9.4, 9.7	1907.2	101.8	2.04	1	1906.2	98.9	1.97
3,787	A.G. 134	6 58 23	+24 34	9.0, 9.2	1906.9	21.0	1.63	4	1902.7	21.3	1.48
	AC			11	1908.7	354.4	16.20	2	1820+	355±	15±
3,792	Ho. 342	6 58 39	+13 12	8.0, 8.8	1909.3	82.6	1.07	10	1891.7	75.8	0.76
*3,793	Σ 1009	6 59 42	+52 52	6.7, 6.8	1913.5	153.0	3.65	4	1830.3	159.2	2.94
*3,810	Ho. 29	7 0 45	+20 7	9.5, 9.7	1906.9	156.5	5.11	4	1883.3	158.5	3.43
3,808	A.G. 135	7 1 6	+38 22	9.4, 9.8	1910.2	27.5	3.70	2	1902.8	29.4	3.90
3,814	Σ 1014	7 1 7	+26 15	8.7, 8.7	1909.6	37.2	1.94	4	1830.2	32.2	2.09
3,818	β 900	7 1 14	+21 7	8.2, 11.7	1899.5	275.1	1.48	4	1880.2	272.6	1.58
3,819	Hu. 454	7 1 16	+21 48	9.1, 11.3	1910.9	213.2	1.96	4	1902.1	217.8	2.00
	AC			10.5	1911.3	45.7	13.12	1			
13,124	Hu. 836	7 1 44	+33 11	9.1, 11.3	1912.2	305.9	1.10	1	1903.7	308.4	1.59
3,836	Σ 1018	7 3 50	+36 1	8.5, 9.7	1904.3	16.7	9.73	1	1830.8	16.9	9.76
*3,844	OΣ 165	7 4 4	+16 3	5.0, 10.7	1897.2 1905.5	43.9 37.7	3.66 4.54	3 3	1847.2	130.7	3.87
3,849	Σ 1027	7 4 27	+17 2	8.1, 8.2	1904.3	356.5	7.01	1	1830.7	356.2	6.73
3,853	Ho. 519	7 5 1	+25 52	7, 13	1906.2	117.0	20.70	1	1891.8	124.1	19.71
3,852	Σ 1024	7 5 7	+38 15	8.3, 8.8	1904.3	315.6	1.29	3	1831.6	313.4	1.46
3,856	Ho. 518	7 5 37	+30 29	8, 10	1905.6	146.6	2.88	4	1896.2	143.3	2.87
3,855	Hu. 618	7 6 14	+51 31	8.8, 10.8	1912.3	121.8	1.36	1	1903.0	122.1	1.39
3,862	β 1009	7 6 22	+30 22	5.0, 11.5	1899.2	183.6	2.10	1	1882.0	178.2	1.87
3,871	Ho. 30	7 7 38	+29 49	9, 9	1906.2	125.2	5.60	2	1886.2	125.9	5.48
*3,876	Σ 1037	7 8 9	+27 22	7.1, 7.1	1897.00 1901.94 06.79 11.18 13.96	304.5 299.0 295.8 293.0 285.5	0.91 0.79 0.60 0.48 0.45	13 14 12 11 10	1830.42	332.7	1.11
	AC=OΣ 166 rej.			11.0	1902.2 11.6	110.5 107.4	16.36 15.72	2 4			15±

† B.D. 39°.1825.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
3,882	Weisse 14	h m s	° ′			°	"			°	"
3,882	Weisse 14	7 8 31	+15 19	7.8, 9	1905.1	156.9	1.98	4	1901.5	157.1	2.21
3,889	H. 3290	7 8 51	+14 42	11, 12	1905.2	332.3	3.52	1	1831+	315±	3±
*3,890	OΣ 520	7 9 8	+28 38	7.0, 9.0	1909.5 13.0	356.9 6.9	0.69 0.48	4 1	1850.8	343.6	0.55
3,891	Ho. 31	7 9 12	+30 5	9.0, 9.5	1906.2	9.1	10.79	3	1886.2	7.4	10.91
3,897	Ho. 32	7 9 33	+30 13	9, 9	1906.2	160.6	4.70	2	1886.2	162.2	4.39
*3,905	Ho. 343	7 10 8	+25 2	6, 12	1906.2	263.5	24.00	1	1890.2	257.0	22.36
3,919	†Lewis 8	7 10 7	+26 1	9.5, 10.0	1900.2	226.5	0.72	1			
3,912	β 1023	7 10 32	+26 1	8.4, 8.5	1900.5 09.6	296.3 298.0	0.26 0.36	6 3	1891.2	294.0	0.25
*3,949	OΣ 170	7 13 33	+ 9 26	7.5, 7.5	1896.3 1903.2 11.9	110.9 108.4 106.6	1.30 1.47 1.56	7 12 8	1844.8	133.0	0.96
3,968	Ho. 33	7 15 32	+22 18	9, 12	1906.5	325.1	2.78	3	1904.0	327.7	2.56
*3,972	Σ 1068	7 15 36	+13 31	8.3, 9.0	1912.5	349.6	3.85	8	1830.2	354.3	3.89
*3,970	Σ 1066	7 15 39	+22 7	3.2, 8.2	1893.2 1903.6 12.3	206.8 208.3 209.9	7.42 6.93 6.66	2 7 3	1829.7	196.9	7.14
3,977	Σ 1070	7 16 28	+34 10	8.2, 9.2	1904.3	323.5	2.04	1	1830.9	319.2	1.87
*3,990	Σ 1074	7 16 40	+ 0 33	7.8, 8.2	1895.9 1909.2	139.5 142.4	0.61 0.40	7 2	1831.5	115.4	0.48
	AC=β 577			13.5	1895.7 1904.2	104.8 104.2	13.96 12.60	2 1	1892.2	100.0	12.75
	AD			13	1904.2	12.6	15.75	1	1878.2	9.9	14.54
3,999	Ho. 243	7 17 54	+29 24	9.3, 9.5	1904.2	166.7	2.37	6	1885.3	166.1	1.79
4,005	Ho. 345	7 18 14	+22 13	9.0, 10.0	1906.2	284.0	1.16	1	1890.1	282.2	0.90
*4,004	β 1024	7 18 23	+29 27	9.0, 11.5	1905.2	89.4	1.46	1	1892.3	103.2	1.40
4,011	β	7 19 25	+37 55	9.5, 9.5	1907.3	63.6	2.11	2	1880.1	64.6	1.76
*4,016	Σ 1081	7 19 42	+21 36	7.8, 8.5	1893.2 1911.6	226.4 227.7	1.69 1.52	2 14	1828.9	216.1	1.33
4,013	Σ 1079	7 19 43	+37 58	8.5, 10.0	1904.3	331.7	5.87	1	1830.9	330.7	5.91
4,015	Ku. 29	7 20 5	+39 57	9.5, 10.0	1910.3	143.0	3.26	1	1901.1	146.3	3.43
4,035	Hu. 706	7 20 43	+20 5	9.5, 9.5	1910.0	232.0	0.69	4	1902.3	234.7	0.66
4,041	A.G. 140	7 21 30	+22 14	8.7, 10.3	1908.3	174.5	2.18	8	1902.5	175.3	1.57
4,042	Ho. 346	7 21 33	+18 18	7.0, 11.8	1906.2	60.2	13.18	2	1891.3	58.1	12.67
4,043	OΣ 171	7 21 52	+31 46	7.1, 9.9	1909.2	132.3	1.18	4	1851.3	130.0	0.97
4,047	Σ 1089	7 21 56	+15 0	8.5, 8.5	1909.5	7.3	7.30	3	1829.5	8.0	7.20

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
4,058	Σ 1094	7 23 10	+15 28	7.7, 8.7	1908.7	95.7	2.32	4	1829.5	96.3	2.41
4,057	A.G. 141	7 23 32	+36 17	9.2, 9.4	1910.2	32.8	4.23	2	1902.8	33.5	4.49
4,074	β 21	7 24 0	+ 7 6	5.5, 11.3	1898.2 1909.6	28.2 25.3	4.04 4.13	2 3	1875.4	27.4	4.09
4,062	Σ 1091	7 24 14	+50 8	8.2, 8.7	1904.3	330.9	29.14	1	1829.3	335.9	28.59
*4,065	Σ 1093	7 24 37	+50 9	8.2, 8.2	1904.3 12.3	147.0 146.1	0.54 0.67	3 1	1831.9	96.4	0.58
4,069	Σ 1092	7 24 44	+49 24	8.0, 9.8	1913.2	73.6	2.77	2	1831.9	71.1	2.61
*4,098	Σ 1104	7 25 58	-14 49	6.7, 8.3	1893.2 1913.2	328.5 338.9	2.24 2.57	2 1	1831.9	292.4	2.35
4,099	Ho. 34	7 26 48	+21 15	9.2, 9.5	1906.1	10.5	2.45	2	1889.1	14.1	1.96
4,120	β 579	7 29 35	+33 17	7.2, 11.5	1899.6	219.0	0.96	3	1878.2	219.1	0.84
	AC=OΣ 173 rej.			12.0	1898.2	231.3	19.39	1	1869.8	233.6	18.23
4,125	Σ 1114	7 29 36	+ 9 27	8.5, 9.0	1910.3	56.3	6.72	1	1830.9	53.6	6.52
*4,122	Σ 1110	7 29 50	+32 3	2.7, 3.7	1896.6 1902.9 12.1	227.1 224.0 220.3	5.78 5.65 5.48	20 14 10	1826.2	262.5	4.40
	AC			9.5	1915.1	163.0	73.18	1	1835.2	162.5	72.54
4,126	Hu. 707	7 29 58	+21 47	8.5, 12.8	1907.2 15.2	23.7 21.2	2.40 2.45	3 1	1902.3	19.6	2.46
4,130	OΣ 175	7 30 23	+31 7	6.0, 6.6	1897.4 1901.7 10.1	332.4 330.1 328.2	0.64 0.63 0.70	14 18 5	1847.6	333.8	0.46
4,127	Ma. 2	7 30 28	+43 12	9 , 9	1912.2	120.8	2.90	1	1843.3	116.5	3.89
4,129	OΣ 174	7 30 41	+43 12	6.5, 8.1	1913.2	85.6	1.97	3	1851.4	84.3	1.96
4,137	Ku. 30	7 31 6	+34 29	9.2, 9.6	1912.3	112.1	3.06	1	1901.1	110.7	3.39
4,165	Σ 1119	7 33 39	+33 53	8.0, 9.3	1913.5	347.3	2.93	4	1829.6	350.0	2.89
4,181	OΣ 176	7 34 39	+ 0 41	7.3, 9.3	1897.0 1910.3	208.3 208.8	1.51 1.20	5 1	1855.9	210.4	1.54
4,184	Ho. 245	7 34 55	- 1 17	8 , 8	1911.8	184.5	0.40	5	1887.2	178.4	0.38
4,187	Schaeberle	7 35 25	+ 5 26	1.0,	1898.24 1900.24 02.22 04.30 05.17 09.30 13.14 14.30	326.0 338.3 344.9 355.2 5.3 22.5 34.3 29.0	4.26 4.83 5.39 4.93 4.46 5.04 .. 6.14	3 1 2 2 1 1 1 1	1896.93	320.4	4.63
4,188	Bird 2	7 35 48	+ 5 27	9.1, 9.2	1900.8 12.2	192.0 186.9	0.63 0.60	2 1	1872.9	182.6	0.79
*4,193	Σ 1126	7 36 8	+ 5 24	7.2, 7.5	1896.9 1903.2 12.6	143.7 144.0 145.7	1.09 1.14 1.15	9 13 8	1829.4	132.0	1.46

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	"
4,190	Hu. 457	7 36 15	+23 25	8.5, 12.3	1910.2	147.9	2.45	3	1902.2	146.3	2.32
*4,191	OΣ 177	7 36 42	+37 36	7.5, 8.5	1897.0 1901.0 10.2	124.1 121.4 122.5	0.57 0.54 0.42	10 12 3	1845.6	149.9	0.58
4,200	A.G. 142	7 36 58	+23 22	8.8, 10.0	1911.8	18.7	1.63	7	1902.1	16.0	1.52
4,204	Ho. 523	7 37 17	+21 49	9, 10.5	1906.7	322.6	8.48	4	1894.1	322.7	8.58
4,208	A.G. 143	7 37 19	+1 19	8.7, 9.7	1910.3	99.6	5.37	1	1903.2	97.6	5.53
4,211	Σ 1130	7 37 36	+9 53	8.4, 8.9	1912.2	168.0	1.09	9	1829.4	162.0	2.04
4,233	β 580 CD	7 40 46	+28 13	10, 12.5	1901.3	137.1	1.45	1	1878.1	128.0	1.40
4,244	Ho. 247	7 41 43	+21 19	7.5, 8.0	1905.2 12.5	108.7 128.3	0.43 0.39	7 17	1887.2	101.3	0.36
4,246	Ho. 347	7 41 58	+17 12	8.0, 12.2	1906.2	277.4	14.60	2	1892.7	280.3	13.71
4,247	Schj. 8	7 42 2	+13 55	8.5, 9.0	1908.1	24.2	2.23	2	1875.8	25.5	2.20
4,252	Ho. 36	7 42 59	+25 39	8.5, 8.5	1906.9	297.7	0.61	6	1883.2	299.9	0.98
4,279	Ho. 37	7 45 11	-2 5	8, 8	1910.3	173.6	1.29	1	1882.2	177.3	1.50
4,280	Σ 1147	7 45 48	+24 43	9.0, 9.0	1908.2	165.1	2.30	6	1830.7	162.3	2.46
*4,310	β 101	7 48 18	-13 42	5.6, 6.7	1899.04 1901.32 03.17 13.23	295.9 302.7 305.5 74.8	0.32 0.48 0.44 0.30	1 1 1 1	1875.24	289.7	0.58
*4,312	OΣ 182	7 48 46	+3 35	7.0, 7.5	1895.8 1901.4 12.2	32.6 31.3 32.1	1.33 1.06 0.91	8 4 9	1853.4	47.0	1.09
4,315	A.G. 145	7 49 0	+9 18	9.2, 9.6	1911.2	247.7	4.83	2	1895.3	246.6	5.67
*4,333	Σ 1157	7 50 47	-2 36	8.0, 8.0	1896.9 1913.7	248.7 244.5	1.06 1.13	6 2	1831.2	267.3	1.59
4,341	Σ 1158	7 52 6	+22 5	8.8, 10.0	1907.7	332.0	7.65	4	1829.9	333.0	7.53
	AC			12.5	1907.2	256.0	18.70	1	1905.1	268.8	19.00
	AD				1907.2	154.2	58.35	1			
	AE			9.8	1907.2	304.7	65.30	1			
4,346	Ho. 250	7 52 42	+21 10	7, 9	1907.8	155.8	0.68	10	1887.2	160±	0.5±
4,339	A.G. 146	7 52 46	+50 28	9.1, 9.1	1912.3	283.8	3.18	1	1900.1	285.2	3.14
*4,355	OΣ 185	7 53 26	+1 20	6.8, 7.0	1897.58 1902.01 10.14 11.91 14.60	16.4 21.7 30.2 31.1 39.3	0.34 0.34 0.38 0.39 0.33	5 5 3 3 3	1847.29	23.5	0.39
4,353	Σ 1161	7 54 18	+46 50	7.8, 9.7	1913.2	193.0	2.68	2	1830.6	193.4	2.49

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*4,365	Σ 1165	h m s	° ′			°	"			°	"
		7 56 15	+54 50	8.0, 10.3	1904.3	274.5	0.58	1	1831.9	265.3	0.73
*4,377	Σ 1171	7 56 33	+23 48	6.2, 10.7	1911.1	327.7	2.49	6	1828.9	338.6	2.80
4,382	H.2423=Ho. 348	7 56 54	+19 48	8, 12	1906.7	261.9	5.96	6	1892.7	261.7	5.25
4,396	Ho. 349	7 58 24	+12 40	8, 13	1906.5	225.4	10.13	4	1891.8	226.2	9.97
*4,402	Σ 1175	7 58 28	+ 4 22	7.8, 9.7	1898.3 1911.5	223.5 230.7	1.66 1.66	6 4	1831.2	204.6	2.37
4,405	β 23	7 58 35	+ 3 19	8.2, 12.0	1912.2	184.4	2.50	1	1875.5	177.0	2.81
4,390	Hu. 713	7 58 37	+49 31	9.0, 9.0	1913.3	130.3	4.54	2	1903.0	129.2	4.78
4,388	Σ 1172	7 58 45	+54 58	7.6, 9.4	1904.3	244.0	1.68	1	1829.8	242.0	1.62
4,399	ÓΣ 186	7 58 46	+26 29	7.5, 8.2	1909.2	75.2	0.66	2	1847.9	74.1	0.79
4,400	Σ 1174	7 59 21	+47 31	8.0, 8.5	1904.3	213.7	5.80	2	1830.9	215.0	5.67
*4,406	ÓΣ 187	7 59 22	+33 15	6.9, 7.5	1893.24 10.93 13.94	278.1 255.8 243.1	0.34 0.27 0.23	2 3 3	1844.02	306.9	0.47
*4,414	β 581 BC	8 0 13	+12 31	8.0, 8.0	1896.59 1902.36 10.16 11.74 13.02 14.22 15.26	274.4 296.5 70.1 111.4 114.4 126.2 132.3	0.48 0.42 0.27 0.26 0.30 0.27 0.33	8 12 2 2 2 1 3	1878.15	176.9	0.40
	AB, C			10.5	1896.4 1904.6	198.4 196.1	5.02 4.80	5 9	1878.1	185.3	4.76
*4,418	β 582 BC	8 0 36	+12 18	8.5, 12.0	1903.9	56.8	4.14	3	1878.4	59.8	3.76
	AB=Σ 1179			8.5, 8.5	1903.9	204.8	20.52	3	1829.7	205.2	17.91
*4,421	Σ 1177	8 1 2	+27 45	6.5, 7.4	1910.7	351.5	3.48	4	1828.3	354.7	3.51
4,425	Σ 1181	8 1 21	+ 8 25	8.0, 9.5	1911.5	139.0	5.08	4	1830.2	140.3	5.18
4,426	Σ 1182	8 1 25	+ 6 3	7.0, 9.0	1911.5	73.3	4.43	4	1831.2	72.6	4.39
4,447	Σ 1186	8 1 21	+ 8 25	7.1, 10.4	1904.7	220.3	3.42	6	1828.3	218.8	3.17
4,441	A.G. 149	8 3 8	+ 7 36	9.6, 9.6	1910.3	236.8	5.72	1	1895.3	238.0	6.01
4,444	Σ 1185	8 3 15	+ 1 34	8.8, 9.7	1911.2	98.4	3.72	2	1830.9	102.4	3.48
13,152	Hu. 849	8 4 5	+37 26	8.8, 9.0	1910.3	286.7	1.06	1	1904.9	286.0	1.26
13,153	Hu. 850	8 4 27	+37 48	8.7, 9.1	1911.6	354.5	0.67	6	1904.9	1.5	0.73
4,448	Σ 1184	8 4 29	+38 5	8.0, 8.5	1901.4	341.0	27.06	5	1829.8	340.4	27.14
4,451	Σ 1188	8 4 39	+30 34	8.0, 8.7	1915.1	201.8	16.17	1	1827.3	201.3	15.85
*4,452	Σ 1187	8 4 44	+32 26	7.1, 8.0	1896.4 1903.5 12.5	44.7 44.0 40.4	2.10 2.21 2.30	12 16 11	1829.5	71.0	1.61
4,462	A.G. 150	8 6 1	+ 4 16	9.0, 9.5	1910.3	27.8	4.96	1	1903.2	28.3	4.73

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
*4,467	Σ 1194	8 6 34	+ 2 8	8.7, 10.4	1910.7	316.8	3.11	2	1832.0	323.0	3.04
4,468	Espin 71	8 7 52	+53 29	9.0, 9.1	1914.3	282.1	2.99	1	1901	285.1	3.2
*4,477	Σ 1196	8 7 55	+17 53	5.0, 5.7	1894.22	24.2	1.14	4	1826.22	57.6	1.14
					96.42	16.2	1.09	8			
					98.62	10.1	1.06	11			
					1900.84	4.3	1.03	5			
					02.89	357.6	1.09	9			
					04.68	350.9	1.08	7			
					06.57	344.6	1.10	8			
					08.89	334.1	1.18	8			
					10.91	325.6	0.94	6			
					12.81	316.8	0.97	5			
					14.48	310.0	0.98	7			
	AC			5.5	1897.1	115.7	5.27	21	1826.2	154.7	5.30
					1905.1	110.3	5.32	33			
					12.8	112.8	4.94	16			
	BC				1896.6	127.9	5.59	20			
					1905.1	122.5	5.99	28			
					12.6	117.3	5.87	14			
	AB, C				1904.9	116.0	5.52	3			
4,476	Σ 1197	8 8 6	+29 46	8.2, 9.0	1910.3	103.0	1.71	5	1829.3	102.6	1.65
4,488	Ho. 38	8 9 18	+28 0	8, 13	1906.5	83.6	7.33	4	1886.2	80.5	7.47
*4,492	Σ 1202	8 9 28	+11 5	7.7, 9.8	1896.5	319.4	2.28	7	1829.6	335.9	2.36
					1903.0	317.4	2.51	5			
					12.7	317.0	2.41	8			
4,494	β 204	8 9 31	+10 37	7.1, 10.1	1910.9	299.0	0.80	3	1875.9	302.1	1.06
*4,502	β 1244	8 9 51	+ 2 13	7.9, 8.1	1900.2	41.2	0.67	5	1891.2	50.3	0.74
					11.6	39.1	0.70	5			
13,156	Hu. 1123	8 9 53	+36 45	8.5, 8.8	1908.2	156.2	0.36	3	1905.3	161.6	0.47
4,499	β 1243	8 9 54	+17 54	7.1, 13	1903.2	346.5	1.03	1	1891.2	344.7	1.40
4,497	Σ 1200	8 10 28	+50 0	8.5, 8.5	1907.8	0.8	8.17	2	1830.3	0.7	8.40
4,508	Σ 1204	8 10 58	+38 43	8.0, 9.0	1904.3	103.2	11.99	1	1829.3	103.9	11.82
4,519	Ho. 524	8 11 40	+18 56	8, 11	1905.6	338.1	4.00	3	1894.3	343.7	3.88
	† Bowyer	8 12 2	+32 29	8.5, 9.0	1909.4	214.2	4.57	6			
4,527	Hu. 625	8 12 48	+33 4	8.8, 11.2	1911.0	351.5	1.59	4	1903.0	350.9	1.78
*4,531	Σ 1211	8 13 23	+39 14	8.7, 9.2	1898.0	129.1	0.89	7	1831.3	132.7	1.64
					1911.1	124.6	0.85	7			
4,533	Σ 1212	8 13 24	+31 4	8.2, 9.7	1909.4	236.5	5.32	5	1829.3	233.7	5.44
*4,526	Σ 1205	8 13 26	+56 41	8.5, 8.8	1899.3	175.9	0.98	1	1832.0	185.5	0.78
					1912.6	175.1	1.01	3			
4,553	Hu. 626	8 15 26	+32 33	8.0, 12.0	1906.8	154.4	3.14	2	1903.0	153.6	3.36
4,556	β 1320	8 15 46	+17.15	9.5, 9.8	1911.2	2.3	4.75	2	1904.0	0.2	4.80

† B.D. + 32° 17.05.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 4,570	Σ 1216	h m s 8 17 32	° ' " — 1 21	7.5, 8.2	1893.2 1902.1 14.3	° 186.4 198.2 214.8	" 0.35 0.42 0.36	3 5 3	1831.2	° 115.2	" 0.45
13,162	Hu. 855	8 18 19	+13 24	9.2, 10.8	1909.3	223.8	1.02	3	1905.1	227.7	1.03
4,577	Ho. 525	8 18 43	+20 16	8.5, 8.5	1905.8	152.3	0.55	7	1895.3	150.5	0.39
4,578	Σ 1218	8 19 2	+23 26	8.5, 10.0	1908.9	269.8	4.20	3	1831.0	269.0	4.34
13,164	Hu. 856	8 20 29	+37 38	7.5, 8.2	1911.6	261.9	0.26	4	1904.9	264.7	0.25
4,591	Σ 1220	8 20 50	+24 35	8.0, 9.5	1904.3	212.8	29.43	1	1828.8	208.3	29.89
* 4,602	Σ 1224	8 22 13	+24 47	6.0, 7.1	1893.2 1911.2	41.7 44.4	6.13 5.82	3 10	1830.8	37.3	5.84
* 4,601	Σ 1223	8 22 16	+27 11	6.0, 6.5	1893.2 1911.5	217.0 216.2	4.35 4.87	2 14	1829.5	212.0	4.56
4,599	Hu. 714	8 22 16	+32 26	8.5, 9.0	1906.3	344.3	0.53	1	1902.8	327.6	0.38
4,611	Σ 1228	8 23 7	+27 48	8.0, 8.5	1893.2 1911.2	350.4 350.0	9.27 8.98	2 3	1828.3	352.0	8.93
4,627	A. 550	8 23 56	— 4 10	7.5, 7.5	1915.3	182.1	0.23	2	1903.0	189.7	0.16
4,620	Σ 1225	8 24 15	+51 27	8.5, 8.5	1907.8	192.4	3.61	2	1831.3	194.2	3.48
4,634	A. 551	8 24 42	— 2 16	7.4, 7.5	1911.3	57.1	0.28	4	1903.0	59.7	0.24
4,643	Σ 1237	8 26 1	+ 8 40	9.0, 11.8	1904.3	173.8	5.17	1	1831.2	177.0	5.40
4,641	Hu. 627	8 26 23	+34 46	9.0, 10.0	1906.8	266.2	0.88	2	1903.0	266.0	0.88
4,654	Σ 1239	8 27 36	+37 45	8.5, 9.8	1909.0	290.3	12.68	3	1829.3	289.0	12.66
4,657	Hu. 717	8 27 54	+32 43	8.5, 9.0	1906.3	52.7	0.45	2	1902.8	57.6	0.38
4,656	Σ 1235	8 28 21	+57 11	8.0, 10.0	1907.8	84.9	1.25	2	1832.0	79.8	1.09
4,666	Σ 1243	8 30 1	+ 1 51	8.0, 10.3	1893.2	225.5	1.51	2	1830.9	221.4	1.99
4,665	Σ 1242	8 30 45	+47 23	8.6, 9.3	1909.0	171.7	2.50	3	1832.5	170.5	2.54
4,675	Σ 1246	8 31 49	+10 10	8.4, 9.4	1904.3	115.7	10.78	1	1829.2	114.1	10.28
4,669	A.G. 153	8 30 49	+34 52	9.0, 9.1	1912.3	91.4	2.80	7	1902.8	90.2	2.85
4,682	A.G. 154	8 32 33	+23 31	9.1, 9.3	1905.0 10.1	4.6 3.3	1.59 1.60	4 11	1901.3	5.4	1.72
4,679	Σ 1244	8 32 40	+42 4	8.2, 9.8	1909.8	0.7	3.50	4	1831.9	5.8	3.58
13,168	Hu. 858	8 34 4	+16 14	9.1, 9.8	1909.3	159.5	0.83	2	1905.2	157.7	0.76
4,696	Σ 1251	8 34 50	+41 33	9.0, 9.7	1909.0	28.0	6.27	3	1831.0	29.2	6.17
4,715	β 585	8 36 56	+20 45	7.5, 9.0	1902.6 13.4	108.4 103.6	0.47 0.48	5 4	1878.1	106.4	0.40
4,717	Ku. 32	8 37 1	+19 33	8.4, 10.2	1910.3	167.6	2.04	9	1902.1	172.1	2.13
4,721	Σ 1262	8 37 34	+24 4	8.0, 10.0	1907.8	200.4	7.15	4	1830.2	201.7	6.62

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
4,731	Ho. 354	h m s	° ′			°	"			°	"
4,730	β 209	8 38 14	+26 19	8.2, 8.8	1905.3	180.9	0.86	7	1892.0	176.1	0.68
		8 38 21	+39 5	8.4, 8.7	1901.5 10.2	359.1 357.5	1.50 1.38	4 2	1875.8	355.4	1.56
4,739	Ho. 355	8 39 10	- 2 26	8, 8	1907.3	182.0	0.38	2	1892.8	184.4	0.39
4,742	Σ 1265	8 39 44	+13 53	8.4, 10.8	1911.9	310.1	5.76	7	1829.9	311.4	5.85
* 4,743	Σ 1263	8 40 17	+41 58	7.6, 8.2	1894.3 1908.4 13.3	20.4 20.6 20.6	50.67 60.73 64.20	2 2 1	1829.5	4.1	5.43
4,744	Krueger 30	8 41 2	+57 58	9.5, 9.5	1912.3	116.9	1.96	1	1891.1	117.1	1.45
4,758	Ho. 251	8 41 44	+25 35	8.5, 12.2	1904.8	153.8	4.01	2	1887.3	151.1	3.73
4,753	Σ 1259	8 41 48	+38 46	8.5, 9.0	1909.0	340.9	4.98	3	1829.9	340.9	4.97
* 4,771	Σ 1273 AB, C	8 42 49	+ 6 42	3.8, 7.8	1897.6 1904.2 13.2	231.7 234.7 241.9	3.51 3.35 3.37	12 28 12	1830.6	195.6	3.20
	Schiap. = AB			4.0, 5.5	1896.27 1899.43 1901.30 02.24 02.30 03.14 03.28 04.27 08.27 09.93 11.34 12.32 13.00 14.26 15.28	211.4 264.3 (278.4) (22.2) (280.0) 121.5 (26.6) 145.6 180.8 198.4 211.3 222.3 242.0 250.6 279.8	0.22 0.21 0.15 <.2 0.10 0.16 0.34 0.23 0.25 0.23 0.26 0.26 0.32 0.25 0.19	1 5 5 4 1 2 1 4 4 3 2 3 1 3 2	1888.28	142.0	0.21
	AB, D			3.8, 12.5	1899.2	195.2	20.25	1	1878.6	192.0	20.05
4,780	Hu. 458	8 43 55	+19 55	9.0, 12.5	1915.2	195.0	1.80	1	1902.3	197.9	1.56
	‡ Espin 294	8 44 10	+36 25	9.0, 9.2	1907.3	160.2	1.70	2	1906.1	162.5	1.70
* 4,777	Σ 1271	8 44 26	+56 29	8.6, 9.7	1914.2	66.2	1.22	2	1832.4	59.3	1.41
4,778	Σ 1274	8 44 10	+38 37	7.0, 8.7	1909.0	42.4	9.08	3	1830.3	40.8	8.89
4,785	β 335	8 44 19	+ 2 54	7.2, 10.5	1909.7	273.0	2.48	2	1876.0	268.3	2.72
4,789	Σ 1279	8 45 7	+39 52	8.3, 8.3	1910.3	89.5	1.39	7	1831.9	93.6	1.60
4,790	Σ 1278	8 45 27	+49 36	8.0, 10.0	1909.0	124.8	8.53	3	1829.8	125.6	8.43
4,795	β 1068	8 45 27	+ 9 9	7.7, 8.8	1901.1	184.7	0.35	8	1889.2	189.9	0.45
	AB, C			12.8	1903.3	310.9	17.58	1	1889.1	313.0	17.80
4,788	Σ 1275	8 45 41	+57 47	8.0, 8.0	1907.8	195.4	1.70	2	1832.3	196.1	1.97
4,811	† Bowyer 2	8 46 2	+ 8 33	8.0, 8.0	1907.2	44.5	2.94	3			
4,804	A.G. 157	8 46 5	+23 25	9.3, 9.5	1908.1	76.6	1.98	16	1901.3	75.5	2.05

† Lalande 17395.

‡ B.D. + 36°.1873.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"			°	"
* 4,808	Ho. 40	8 46 28	+31 41	9.0, 9.3	1907.3	287.3	0.62	2	1884.7	272.3	0.55
4,820	Perrotin	8 47 14	+ 8 37	7.5, 8.7	1900.1	347.5	0.70	11	1884.2	349.3	0.78
4,821	Σ 1287	8 47 21	+12 25	8.0, 10.3	1912.2	92.8	1.90	6	1830.6	99.4	1.40
* 4,828	β 587	8 47 54	- 6 54	6.0, 9.0	1907.3	143.2	0.76	2	1878.2	159.9	0.45
4,829	Σ 1290	8 48 7	+ 4 45	8.0, 9.9	1905.2	313.5	2.94	2	1834.5	315.1	3.27
4,826	Σ 1288	8 48 15	+28 44	8.9, 9.0	1909.9	258.8	7.46	5	1836.3	258.9	7.52
* 4,839	Σ 1291	8 49 41	+30 52	5.9, 6.4	1893.2 1912.8	327.9 322.5	1.23 1.44	3 12	1829.7	333.3	1.51
4,835	Σ 1289	8 49 45	+43 53	7.7, 8.5	1909.0	5.2	3.81	3	1830.3	4.2	3.80
	† A. 2131	8 50 28	+26 30	6.9, 8.0	1914.3	269.5	0.22	4	1910.1	254.6	0.32
13,173	Hu. 861	8 53 36	+14 31	8.5, 9.1	1908.7	22.0	0.30	2	1905.2	22.7	0.36
4,863	Σ 1293	8 53 57	+54 16	7.8, 9.0	1904.3	95.1	18.89	1	1830.7	92.2	18.62
4,869	Σ 1296	8 54 37	+35 15	8.5, 9.0	1903.9	73.7	2.41	2	1830.6	71.2	2.83
4,876	Hu. 718	8 54 55	+32 43	8.7, 8.9	1910.2	192.5	0.47	7	1902.8	202.2	0.51
4,879	Ho. 360	8 56 10	+22 45	8.0, 12	1906.2	151.3	3.83	3	1892.7	148.4	3.91
4,880	Σ 1297	8 56 12	+23 1	8.2, 9.3	1905.3	159.6	4.66	2	1831.9	162.2	4.70
* 4,890	Σ 1300	8 57 10	+15 35	8.7, 8.8	1893.2 1911.2	200.1 195.9	5.14 5.06	2 13	1830.8	210.0	4.11
4,893	Σ 1301	8 57 31	+26 30	8.5, 9.0	1907.8	358.0	10.19	2	1829.3	0.2	9.96
* 4,901	β 211	8 58 4	+ 2 58	7.5, 10.0	1912.2	266.6	0.78	2	1875.3	257.7	1.11
4,910	Ho. 41	8 59 48	- 2 6	9, 10	1906.2	71.4	4.08	2	1882.8	69.8	4.01
4,907	A.G. 160	9 0 19	+39 51	9.0, 9.1	1914.3	62.5	4.02	1	1902.8	61.7	4.09
4,918	A.G. 161	9 1 5	+32 44	9.0, 9.2	1909.7	221.4	4.16	4	1902.8	222.6	4.22
4,919	A. 554	9 1 10	+29 1	8.5, 10.5	1911.0	202.8	0.79	3	1903.4	212.4	0.72
4,909	Σ 1303	9 1 21	+65 17	8.3, 10.2	1914.1	282.2	2.48	1	1833.1	278.2	2.72
4,925	A.G. 162	9 2 39	+30 56	9.0, 9.1	1909.3	108.0	3.67	3	1902.8	107.7	3.96
4,929	Σ 1311	9 3 10	+23 17	6.7, 7.1	1908.8	200.2	7.55	4	1831.3	200.5	7.20
* 4,923	Σ 1306	9 3 51	+67 26	5.0, 8.2	1914.1	158.4	1.25	1	1832.1	263.5	4.58
* 4,941	Σ 1316	9 4 9	- 6 50	8.2, 11.5	1899.3	136.1	7.30	1	1832.9	146.3	6.78
	AC			10.5	1899.3	170.7	7.32	1	1832.9	153.1	13.05
	BC				1899.3	242.7	3.64	1			
4,951	ΟΣ 197	9 5 37	+ 3 15	7.4, 9.0	1909.7	62.7	1.43	2	1847.0	61.9	1.38
4,968	Σ 1318	9 8 37	+47 18	7.5, 8.7	1914.3	241.1	3.38	1	1831.0	245.1	3.48

† B.D. + 26°.1865.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
* 4,972	Σ 1321	9 9 36	+53 2	7.4, 7.4	1901.6 13.4	65.2 68.9	19.20 19.16	3 1	1833.0	48.4	20.10
4,977	Ho. 42	9 9 36	+33 52	9.5, 9.5	1906.7	7.1	1.47	4	1885.8	6.1	1.38
4,990	β 455	9 10 55	+ 4 32	9.5, 10.5	1915.2	73.0	1.66	1	1877.3	65.2	1.94
* 4,987	Σ 1327	9 11 6	+28 14	8.0, 9.2	1911.2	73.6	11.07	2	1831.3	81.4	16.13
	AC			9.0	1911.2	23.2	27.15	2	1831.3	27.9	25.07
	CB				1911.2	179.1	21.33	2	1831.3	167.3	20.20
4,996	Ho. 362	9 12 10	+37 41	8.0, 12.2	1906.3	154.6	4.23	1	1892.6	146.6	4.28
	AC			12.5	1906.3	98.8	28.07	1	1892.3	98.7	28.09
* 5,004	β 588	9 12 49	+ 1 3	6.5, 11.0	1915.2	130.7	2.13	1	1878.2	123.2	2.38
* 5,005	Σ 3121	9 13 27	+28 54	7.5, 7.8	1893.3 95.2 97.8 1902.3 07.1 13.0 14.3	4.0 9.3 14.8 22.5 36.3 190.5 199.5	0.32 0.65 0.61 0.70 0.44 0.26 0.29	3 4 11 23 9 3 4	1832.3	20.0	0.85
* 5,011	Σ 1333	9 13 49	+35 41	6.6, 6.9	1893.2 1909.3	46.0 43.9	1.64 1.69	2 2	1828.6	39.4	1.42
* 5,014	Σ 1334	9 14 12	+37 8	4.0, 6.7	1893.2 1909.3	238.3 238.6	2.75 2.98	2 2	1829.2	240.2	2.70
5,016	A. 221	9 14 11	+30 4	8.7, 8.8	1903.0	298.7	0.42	3	1901.7	302.4	0.30
* 5,018	Ho. 43	9 14 21	+21 8	8.0, 8.5	1904.9 14.3	298.9 281.8	0.46 0.34	13 3	1885.8	314.4	0.37
5,020	Ho. 364	9 14 35	+23 14	8.2, 11.2	1906.5	334.2	3.94	3	1892.8	334.6	3.60
5,032	Σ 1339	9 16 19	+37 3	8.5, 9.5	1912.4	72.1	1.27	7	1829.0	73.6	1.24
* 5,030	Σ 1338	9 16 20	+38 31	7.0, 7.2	1893.3 1911.7 19.4	165.7 173.7 179.5	1.52 1.53 1.52	2 5 2	1829.5	121.1	1.76
5,040	A. 127	9 17 16	+20 1	9.3, 10.0	1912.7	27.2	1.30	7	1901.2	27.2	1.21
5,053	A.G. 165	9 19 3	+22 29	9.1, 9.3	1910.2	13.8	1.21	13	1900.2	14.0	1.18
* 5,056	OΣ 201	9 19 30	+28 13	7.5, 9.0	1896.7 1903.9 11.2	222.0 221.8 221.2	1.35 1.50 1.30	10 23 11	1852.4	233.5	1.45
5,062	β 105	9 20 18	+26 30	4.9, 10.7	1900.3 09.0	201.7 205.3	2.71 2.73	2 7	1876.2	203.8	3.05
* 5,071	Σ 1348	9 20 33	+ 6 40	7.5, 7.6	1896.1 1904.4 11.4	322.3 319.8 320.2	1.57 1.84 1.74	9 18 7	1831.0	334.3	1.10
5,066	Lewis 9	9 20 48	+26 20	9.5, 10.0	1901.3 10.7	17.6 18.1	3.40 3.01	1 5			
5,077	A. 222	9 21 38	+28 58	8.3, 8.5	1903.3	324.3	0.34	1	1901.9	325.8	0.23

β.G.C.	Name.	1925°.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
5,079	A. 223	h m s	° '	10.0, 10.2	1911.3	°	"	1	1901.9	°	"
		9 21 48	+28 57			3.6	2.00			14.2	2.03
5,078	A. 4	9 21 49	+31 28	8.7, 10.2	1904.8	45.5	0.98	4	1899.3	45.0	0.87
5,085	Ho. 365	9 22 42	+14 49	7.0, 13	1906.2	152.1	13.24	3	1890.3	153.2	12.85
* 5,094	Σ 1355	9 23 22	+ 6 34	7.2, 7.2	1893.3 1909.7	333.8 334.6	2.43 2.36	3 14	1832.2	328.3	2.84
5,089	Ho. 366	9 23 27	+31 47	8.5, 8.7	1906.3	14.8	0.69	2	1891.3	10.3	0.47
* 5,103	Σ 1356	9 24 26	+ 9 23	6.2, 7.0	1897.0 1903.4 13.1 19.3	110.3 114.3 123.5 127.4	0.65 0.76 0.95 1.07	13 18 12 2	1825.2	153.9	0.97
5,123	β 1071	9 27 56	+52 1	3, 13.7	1898.3	87.1	5.00	1	1889.2	74.9	5.09
5,129	β 909	9 27 59	+22 11	7.2, 12.0	1908.3	91.7	6.30	1	1879.5	91.5	5.66
5,134	H.N. 29=Ho. 367	9 28 56	+28 42	5.0, 10.0	1906.2	257.9	32.18	2	1840.2	256.6	34.95
13,189	Hu. 1128	9 31 11	+36 9	5.5, 14.0	1906.4	36.8	5.40	1	1905.1	35.1	5.85
5,158	Σ 1372	9 33 0	+16 33	8.2, 8.3	1909.4	59.3	0.56	14	1829.6	53.0	0.49
5,161	Ho. 368	9 33 9	+25 40	8.5, 8.9	1905.2	108.5	1.06	6	1892.8	108.1	0.88
* 5,171	Σ 1374	9 36 41	+39 17	7.0, 8.3	1893.3 1905.3	283.4 287.5	3.61 3.11	3 3	1828.3	274.7	3.31
5,174	Σ 1375	9 37 23	+34 54	8.0, 9.8	1907.8	305.2	7.43	2	1829.9	304.5	6.67
5,187	Σ 1377	9 39 34	+ 2 58	7.9, 11.1	1895.2 1910.3	138.3 143.8	3.68 3.76	1 1	1830.2	142.2	3.32
5,195	Σ 1379	9 41 18	+ 9 13	7.5, 11.2	1908.3	172.0	9.48	1	1830.5	173.2	9.61
5,207	Ho. 253	9 43 46	+10 25	7, 12	1906.2	293.6	1.13	2	1887.2	289.2	1.00
5,221	Σ 1384	9 45 51	+16 41	9.0, 9.7	1908.9	182.3	12.07	3	1828.2	181.1	11.77
5,222	Σ 1385	9 45 52	+16 54	8.5, 10.7	1901.9	355.4	1.14	4	1829.9	0.2	1.23
* 5,224	Ho. 369	9 46 40	+36 50	7.7, 7.8	1911.3	113.9	0.25	7	1891.3	98.0	0.32
* 5,223	OΣ 208	9 47 1	+54 25	5.0, 5.6	1899.1 1901.9 11.9	282.1 288.4 309.5	0.30 0.31 0.33	5 11 5	1843.1	8.0	0.48
5,228	A. 344	9 47 45	+29 37	8.6, 9.2	1912.5	33.5	0.53	6	1902.3	29.0	0.44
* 5,233	Σ 1389	9 48 9	+27 20	8.0, 9.0	1896.7 1903.5	311.5 308.6	2.18 2.18	9 17	1830.6	329.2	1.67
* 5,235	A. Clark 5	9 48 48	- 7 45	5.5, 5.7	1901.0 12.5	84.5 69.5	0.33 0.47	7 8	1854.2	50.5	0.55±
5,248	Σ 1395	9 51 23	+10 28	8.0, 10.5	1909.1	228.6	18.79	1	1829.0	228.3	18.84
5,250	A.G. 170	9 51 36	+ 8 27	9.2, 9.2	1908.3	39.7	1.75	2	1895.4	39.1	2.21
5,249	Σ 1392	9 51 45	+29 27	8.5, 11.2	1913.8	175.1	9.41	2	1830.8	179.7	9.39
5,256	Σ 1396	9 52 21	+11 1	8.2, 10.0	1908.3	129.7	3.88	3	1829.2	129.3	3.51

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"			°	"
5,254	Σ 1394	9 52 31	+46 16	8.3, 9.3	1913.4	242.1	4.31	1	1828.3	237.1	3.75
5,255	Σ 1397	9 52 29	+25 24	8.5, 10.3	1912.2	108.8	1.11	6	1830.6	110.4	1.01
* 5,281	OΣ 210	9 57 53	+46 43	7.5, 8.3	1913.4	260.9	1.08	2	1845.3	270.6	0.94
5,295	Hu. 631	9 59 38	+33 1	7.0, 8.6	1907.1	272.8	0.75	5	1903.1	271.9	0.76
5,304	Σ 1406	10 1 19	+31 27	8.0, 8.7	1893.3 1907.9	225.7 228.1	0.98 0.95	2 2	1830.3	228.2	1.14
5,327	Weisse 23	10 3 43	+ 6 44	9.5, 9.6	1909.7	308.6	3.48	2	1895.4	310.1	3.52
5,331	Σ 6, App. II. BC	10 4 24	+12 20	8.7, 12.5	1903.3	81.8	2.25	1	1867.3	93.3	3.90
13,195	Hu. 874	10 7 36	+13 44	7.2, 8.0	1908.3	287.6	0.21	1	1905.2	289.3	0.22
5,347	Σ 1413	10 8 15	+16 43	8.9, 8.9	1910.0	276.4	2.06	14	1830.8	278.5	2.39
* 5,349	OΣ 213	10 8 55	+27 47	7.8, 9.5	1908.7 14.2	100.5 98.4	0.80 0.90	2 3	1856.9	115.2	0.99
5,354	Lewis 10	10 10 29	+18 15	8.0, 8.5	1904.7 13.6	7.8 4.1	1.38 1.54	17 4			
5,359	Σ 1417	10 11 3	+19 29	8.2, 8.2	1909.5	260.8	2.33	4	1830.6	261.4	2.43
5,363	Hu. 634	10 12 0	+33 31	8.4, 9.1	1908.6	163.8	1.73	6	1903.1	167.1	1.83
5,366	Ho. 45	10 12 8	+ 6 21	9, 10	1906.2	143.1	10.36	2	1884.4	145.2	9.60
* 5,365	OΣ 215	10 12 12	+18 6	7.0, 7.2	1896.8 1903.4 11.5 19.3	208.6 206.9 203.7 197.4	0.81 0.86 0.90 1.19	18 32 7 1	1844.5	266.5	0.47
5,372	Σ 1419	10 13 5	+10 29	8.4, 9.1	1909.7	224.5	4.39	5	1828.4	223.8	4.36
5,377	Σ 1421	10 13 53	+27 54	7.5, 8.5	1896.2 1904.4	331.4 330.7	4.81 4.88	1 1	1830.7	330.4	4.39
13,196	Hu. 875	10 13 58	+37 54	7.0, 9.8	1909.4	69.2	0.89	8	1905.0	73.5	0.95
5,379	Σ 1420	10 14 10	+39 29	8.2, 9.9	1910.0	324.6	2.13	4	1831.7	327.5	2.40
* 5,385	Σ 1423	10 15 6	+20 56	8.6, 9.3	1908.5 12.8 19.4	57.5 55.3 50.1	1.48 1.42 1.39	5 11 1	1830.9	99.3	1.12
* 5,388	Σ 1424	10 15 48	+20 13	2.0, 3.5	1895.8 1903.1 11.9 19.4	114.3 115.0 113.8 117.4	3.68 3.69 3.67 3.71	14 20 3 7	1831.5	103.4	2.50
* 5,397	Σ 1426	10 16 36	+ 6 48	7.8, 8.3	1897.7 1904.8 14.2	281.3 281.9 286.1	0.71 0.79 0.75	6 18 7	1832.3	256.8	0.62
	AB, C			9.3	1898.4 1910.5	6.9 7.0	7.72 7.74	7 11	1832.2	9.1	7.43
5,395	Σ 1425	10 17 0	+44 31	8.8, 9.5	1913.4	355.9	4.54	1	1829.7	1.8	4.79

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 5,409	• OΣ 216	h m s 10 18 46	° ′ +15 44	7.0, 10.5	1898.3 1905.1 15.3	° 123.3 114.0 95.1	" 1.15 1.18 1.09	5 13 1	1845.6	° 167.9	" 2.06
* 5,421	Σ 1429	10 20 52	+25 0	8.3, 8.3	1897.5 1902.4 09.8	251.2 253.7 247.5	0.95 0.93 0.74	9 18 8	1829.3	270.6	1.52
* 5,426	Σ 1431	10 21 39	+ 9 9	8.0, 9.7	1909.0	69.5	3.40	4	1832.6	65.9	3.20
5,431	OΣ 217	10 22 50	+17 36	7.3, 7.8	1897.7 1903.9 13.1	149.0 148.7 150.1	0.80 0.80 0.73	11 22 18	1851.3	149.1	0.52
* 5,433	Σ 1434	10 23 5	+18 27	8.5, 8.5	1913.3	277.4	6.24	4	1830.2	269.5	6.08
13,203	Hu. 879	10 23 34	+37 6	4.0, 6.5	1909.1 14.2	230.2 220.8	0.38 0.25	5 6	1905.0	231.0	0.45
* 5,437	OΣ 218	10 23 38	+ 3 56	7.3, 9.2	1900.7 11.3	75.4 79.0	1.04 0.73	8 6	1855.1	63.0	1.21
5,438	Σ 1435	10 23 53	+20 13	9.2, 10.0	1914.3	201.8	8.62	2	1827.3	201.3	8.30
* 5,445	OΣ 220	10 25 14	+10 32	7.1, 9.0	1912.7	69.2	1.31	13	1853.7	62.3	1.27
* 5,448	Σ 1439	10 26 0	+21 11	8.0, 8.5	1893.4 1906.9 11.6 19.4	115.0 112.7 110.3 112.3	1.62 1.85 1.69 1.47	3 11 7 1	1829.3	131.4	2.02
5,452	Ho. 372	10 26 24	+12 1	8.0, 12.0	1906.2	84.6	14.34	2	1891.8	78.2	13.27
13,204	Hu. 880	10 26 55	+37 31	9.0, 9.7	1908.6	123.8	0.73	3	1904.9	121.4	0.74
5,462	Hu. 636	10 28 1	+33 13	9.0, 10.5	1908.3	202.7	1.80	2	1903.0	204.7	1.76
5,468	Σ 1443	10 28 58	+38 4	9.0, 9.0	1909.1	159.3	4.90	3	1829.9	156.3	4.77
5,472	Σ 1446	10 29 32	+15 36	8.5, 9.3	1909.9	249.5	5.44	5	1829.9	251.4	5.11
5,474	Σ 1447	10 29 42	+23 44	7.1, 8.9	1908.8	123.0	4.32	5	1830.9	125.2	4.30
5,484	Σ 1450	10 31 7	+ 9 2	6.0, 8.7	1893.3 1909.8	157.8 156.2	2.42 2.24	4 12	1830.8	161.1	2.39
5,493	OΣ 222	10 33 27	+60 30	6.7, 10.7	1899.4	344.8	4.24	1	1847.7	340.3	4.57
* 5,508	Σ 1457	10 34 49	+ 6 6	7.4, 8.4	1897.2 1911.8	315.7 317.8	1.20 1.42	14 11	1829.6	287.8	0.71
* 5,515	OΣ 224	10 35 47	+ 9 13	7.2, 9.2	1896.9 1902.8 13.6	310.5 298.9 286.6	0.49 0.50 0.46	10 6 3	1843.2	13.7	0.35
5,514	Σ 1459	10 35 54	+38 47	8.0, 8.5	1909.0	153.2	5.22	3	1830.0	153.1	5.23
5,517	Perrotin	10 36 1	+19 37	7.5, 9.7	1901.5	246.3	0.78	13	1884.3	248.5	0.73
	AC=OΣ 225			9.8	1901.9 09.7	351.9 351.3	6.44 6.51	15 3	1851.1	350.7	6.55
5,516	Σ 1460	10 36 14	+42 32	8.1, 8.1	1910.4	165.5	3.25	3	1830.1	168.7	3.31
5,523	Σ 1461	10 37 33	+47 2	8.2, 9.7	1910.4	136.7	9.11	3	1831.3	137.7	8.90

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 5,527	ΟΣ 227	h m s	° ′			°	"		°	"	
		10 37 45	+11 7	7.5, 8.5	1898.6 1902.8 13.9	344.8 345.9 344.7	0.50 0.61 0.67	5 9 12	1845.6	326.5	0.53
5,529	Σ 1463	10 38 28	+47 4	8.5, 9.0	1910.4	257.6	7.61	3	1832.0	258.3	7.49
* 5,533	Σ 1465	10 38 50	+45 0	8.5, 8.8	1899.4 1908.5	7.8 9.2	1.94 1.91	2 1	1829.3	14.4	2.24
5,544	Σ 1468	10 40 38	+21 5	8.7, 8.7	1908.5	332.0	3.99	8	1831.3	334.6	3.75
5,545	Σ 1467	10 40 53	+45 21	8.0, 10.7	1910.4	292.9	3.88	3	1831.3	295.3	4.21
5,546	Ho. 532	10 41 0	+38 52	8, 12	1911.4	314.9	1.10	1	1896.3	326.0	1.18
* 5,558	ΟΣ 228	10 43 13	+22 57	7.2, 8.1	1897.4 1901.7 10.9	188.8 189.6 184.7	0.51 0.49 0.44	14 14 7	1851.7	196.1	0.49
* 5,560	ΟΣ 229	10 43 45	+41 31	6.7, 7.1	1897.4 1902.7 13.4	322.1 318.4 312.6	0.85 0.81 0.99	11 12 5	1846.6	347.0	0.68
5,570	β 596	10 45 26	+17 32	6.5, 13.0	1903.2 14.8	282.9 278.4	1.94 2.54	1 2	1878.3	277.3	2.38
* 5,572	Σ 1476	10 45 29	- 3 38	7.2, 8.0	1896.3 1907.3	4.6 6.7	2.11 2.18	2 2	1832.6	353.7	1.89
5,571	Ho. 374	10 45 35	+23 13	8.4, 12.0	1907.6	271.1	3.62	6	1891.6	272.0	2.75
5,573	β 915	10 45 41	+24 40	9.0, 9.2	1898.0 1904.1	229.0 232.2	1.07 1.51	3 9	1880.4	232.9	1.18
5,582	Δ 14	10 48 16	- 6 48	8.0, 11.2	1907.3	196.9	6.08	1	1864.8	193.0	5.92
	AC=Σ 1481			8.0, 8.8	1907.3	342.7	29.87	1	1829.9	344.1	29.88
5,584	Ho. 376	10 48 38	+23 35	8.8, 10.0	1908.3	218.4	3.09	4	1890.4	215.2	2.17
5,585	Hu. 567	10 48 52	+22 32	9.3, 10.0	1910.4	184.9	0.81	5	1902.4	189.0	0.65
5,598	Hu. 568	10 50 25	+21 7	9.3, 9.8	1910.9	29.7	0.50	2	1902.4	32.4	0.35
* 5,599	ΟΣ 230	10 50 32	+21 10	7.7, 11.2	1904.8	15.3	8.47	2	1847.0	4.7	8.65
* 5,603	Σ 1487	10 51 34	+25 8	5.0, 7.0	1900.3 10.8	106.0 107.0	6.41 6.50	3 5	1830.4	102.8	6.17
* 5,633	Σ 1500	10 56 12	- 3 5	7.6, 8.2	1899.3 1908.3 14.5	310.3 307.7 307.0	1.52 1.48 1.46	1 4 4	1825.2	330.9	1.06
5,637	A.G. 173	10 56 42	+ 3 22	9.1, 9.3	1909.3	124.2	1.97	2	1902.7	126.5	1.69
5,645	Σ 1501	10 58 13	+31 13	9.0, 9.3	1899.2 1911.3	184.2 184.7	1.86 1.75	1 4	1831.3	186.0	1.96
5,651	Ho. 47	10 58 49	+36 4	9.0, 9.0	1907.2	144.5	0.84	6	1884.4	140.3	0.62
	† Bowyer	10 59 21	+23 47	8.5, 10.5	1906.2	50.2	2.50	2			
5,657	Ho. 48	10 59 58	+23 33	8.0, 11.2	1904.0	8.5	1.73	10	1882.7	6.7	1.66

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 5,659	Σ 1504	h m s 11 0 8	° ' " + 4 2	7.5, 7.6	1897.1 1902.8 13.0	° 287.5 290.6 288.1	" 1.17 1.18 1.21	8 4 9	1829.1	° 275.7	" 1.07
5,660	Ho. 377	11 0 20	+38 38	6.0, 12.5	1905.4	252.1	8.33	2	1891.3	249.5	8.42
5,664	Ho. 378	11 0 49	+38 49	8.0, 8.2	1904.0	225.7	0.45	8	1891.3	219.1	0.40
5,671	Σ 1507	11 2 14	+ 7 26	8.2, 10.3	1907.3	164.9	7.61	1	1833.3	164.8	8.03
* 5,676	β 599	11 3 6	+ 2 21	5.5, 11.5	1899.3 1914.8	91.4 89.6	1.26 1.89	1 2	1878.2	82.4	1.78
5,678	Σ 1511	11 3 16	+11 19	8.5, 8.8	1909.8	287.8	7.74	2	1829.9	286.0	7.64
* 5,679	Σ 1510	11 3 41	+53 13	7.1, 8.4	1899.3	334.4	4.46	1	1832.1	341.9	3.90
* 5,694	H. 2562	11 6 39	+31 34	9-10, 12	1911.4	313.6	2.33	1	1830+	347.2	1.5
* 5,707	Σ 1517	11 9 48	+20 32	7.3, 7.3	1897.4 1902.5 08.3 14.1	277.5 268.9 265.0 260.9	0.39 0.44 0.38 0.39	3 23 12 15	1829.8	287.8	1.05
5,709	β 1282	11 10 7	+20 56	9, 9.3	1909.4	193.2	0.60	1	1899.4	204.3	0.36
5,714	OΣ 232	11 10 57	+37 59	7.0, 7.8	1910.6	235.5	0.56	7	1849.9	238.1	0.72
5,715	Σ 1519	11 11 13	+60 11	8.2, 9.2	1899.3	290.6	1.26	1	1832.8	290.8	1.30
5,719	Hu. 639	11 11 16	+47 53	7.5, 7.5	1911.7	269.2	0.30	3	1903.0	274.2	0.32
5,725	Σ 1522	11 12 16	+ 1 59	8.7, 11.7	1899.3	182.2	2.83	2	1830.0	183.1	2.28
5,730	A. 5	11 13 0	- 4 45	8.6, 9.0	1914.3	341.4	0.62	1	1899.3	339.4	0.67
* 5,734	Σ 1523	11 14 14	+31 58	4.0, 4.9	1893.74 98.29 1901.32 03.96 08.49 11.33 14.20 19.42	185.4 158.1 148.4 140.4 127.7 122.1 116.7 105.9	1.79 2.09 2.30 2.50 2.75 2.85 2.94 2.99	5 7 9 7 8 8 11 2	1826.20	238.7	1.75
5,735	Σ 1524	11 14 28	+33 30	3.7, 10.1	1901.7	148.6	7.49	3	1830.7	146.5	7.09
* 5,739	Σ 1527	11 15 5	+14 41	6.9, 8.1	1896.2 1903.4 10.1	18.5 17.3 18.3	3.62 3.35 3.20	6 13 6	1829.3	10.1	3.88
5,740	Σ 1525	11 15 19	+47 53	9.0, 9.0	1907.4	176.8	1.64	1	1832.0	177.7	2.31
5,747	β 791	11 15 46	+ 7 17	8.3, 10.3	1908.8	195.5	2.03	2	1881.3	199.9	2.06
* 5,757	Σ 1534	11 18 15	+18 36	8.0, 11.2	1897.3 1902.6 09.3	327.0 326.2 324.5	5.48 5.22 5.10	4 7 2	1830.8	340.6	4.84
* 5,765	Σ 1536	11 19 59	+10 57	3.9, 7.1	1895.9 1903.3 08.0 13.7 19.4	58.0 53.4 49.5 45.9 36.3	2.47 2.30 2.22 2.05 2.03	7 13 8 15 3	1832.0	92.4	2.19

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
5,770	Σ 1537	h m s	° ' "	7.6, 8.6	1909.5	354.9	2.42	10	1831.6	356.4	2.48
5,780	Ku. 38	11 23 19	+19 32	9.8, 9.9	1909.3	232.5	6.10	2	1901.4	234.0	6.15
5,781	Σ 1541	11 23 33	+46 42	7.8, 10.2	1907.4	27.4	7.85	1	1831.4	29.8	7.53
5,785	Σ 1542	11 23 54	+44 59	7.0, 10.5	1899.4	261.9	3.20	2	1831.8	265.0	2.54
* 5,793	Σ 1543	11 25 4	+39 44	5.2, 8.2	1913.6	1.6	5.36	7	1831.9	10.7	5.37
5,794	Lewis 11	11 25 20	+30 50	7.0, 11.0	1900.9 06.9	7.5 5.0	0.84 0.93	14 9			
5,803	β 340	11 26 8	+ 3 36	8.0, 10.2	1908.8	10.4	3.99	2	1876.3	7.2	3.87
* 5,805	O Σ 234	11 26 46	+41 41	7.0, 7.4	1899.36 1902.49 12.12 19.46	131.7 142.8 158.9 162.3	0.33 0.29 0.37 0.37	4 10 7 2	1844.66	177.5	0.43
5,807	Σ 3072	11 27 1	- 6 19	7.4, 10.4	1909.4	330.4	9.66	1	1831.7	331.8	9.38
5,810	Ho. 51	11 27 49	+ 8 16	7, 12	1905.0	180.0	2.75	3	1882.3	173.6	2.71
* 5,811	O Σ 235	11 28 2	+61 29	6.0, 7.3	1900.35 05.28 12.75 19.45	118.4 180.5 255.4 284.7	0.53 0.35 0.40 0.41	5 2 5 1	1844.90	293.0	0.60
13,215	Hu. 1134	11 28 12	+36 40	7.0, 7.0	1911.5	124.8	0.14	5	1905.1	122.2	0.09
5,822	Hu. 727	11 29 6	+49 51	8.8, 9.2	1910.9	14.2	1.05	4	1903.0	18.3	1.05
5,835	A.G. 175	11 30 55	+ 1 54	8.6, 8.9	1909.7	185.0	2.18	3	1903.2	186.8	1.98
5,840	Σ 1554	11 32 15	+13 15	8.8, 8.8	1901.8 10.1	256.3 260.0	0.85 0.81	11 8	1829.3	255.4	1.01
* 5,841	Σ 1555	11 32 21	+28 11	6.4, 6.8	1896.96 1902.30 08.33 11.76 14.58	351.4 352.0 356.5 358.2 8.8	0.45 0.35 0.29 0.26 0.26	17 22 11 10 7	1829.12	339.3	1.24
	AB, C			11.0	1896.7 1907.2	146.8 147.8	21.50 21.35	3 6	1820+	141.8	18 \pm
	AC				1899.0	146.0	20.75	7			
5,846	Σ 1558	11 32 46	+21 52	8.7, 9.2	1899.2	155.4	1.36	2	1828.8	158.3	1.36
	AC			8.8	1899.2	275.8	43.36	1	1829.3	276.4	43.66
5,850	Ku. 39	11 33 15	+47 52	9.5, 9.8	1908.5	22.4	2.04	1	1901.9	21.7	2.47
* 5,858	Σ 1561	11 34 54	+45 30	5.9, 8.0	1908.5	257.3	9.73	1	1831.7	266.0	10.46
* 5,859	O Σ 237	11 34 59	+41 33	7.4, 9.0	1896.5 1904.9 12.5 19.5	267.3 264.4 262.3 256.2	1.11 1.30 1.28 1.12	7 6 6 2	1845.8	287.0	0.74
5,864	A. 678	11 35 37	+25 42	7.6, 11.3	1911.5	156.4	1.28	7	1904.3	155.5	1.25

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
5,874	Σ 1566	h m s	° ′			°	"			°	"
		11 36 44	+21 26	8.3, 9.8	1899.2 1913.9	350.5 350.5	2.74 2.64	1 3	1829.9	349.3	2.71
5,881	β 792	11 37 51	+ 3 16	8.3, 11.0	1908.3	196.4	2.20	1	1881.3	204.5	1.92
13,217	Hu. 888	11 38 57	+21 30	8.4, 8.9	1907.6 14.3	141.9 146.1	0.66 0.68	7 9	1904.4	148.7	0.74
5,888	β 917	11 39 45	+11 6	8.0, 10.4	1908.8	179.0	3.90	2	1880.3	175.2	3.70
5,889	β 793	11 39 45	+ 6 58	9.6, 10.3	1914.3	114.0	1.34	1	1881.3	114.2	1.33
5,922	Σ 3074	11 44 10	- 8 13	8.8, 9.0	1909.4	301.3	10.94	1	1831.2	302.6	10.54
* 5,926	β 603	11 44 48	+14 41	6.8, 11.0	1897.9 1903.0 08.8 14.0	321.8 315.9 307.5 298.1	0.86 0.86 0.90 0.70	8 6 4 3	1879.3	336.7	1.32
5,928	Ku. 40	11 45 0	+34 6	9.4, 10.0	1912.0	181.9	2.61	5	1901.9	184.6	3.09
5,941	H. 842	11 47 59	+45 13	10, 10.2	1908.5	90.8	2.97	1	1820+	95±	1.5-2
5,948	Σ 3075	11 48 33	+ 7 59	8.8, 8.8	1914.4	3.9	17.99	1	1831.2	5.3	17.69
5,966	Ku. 41	11 51 42	+17 18	9.9, 10.1	1914.3	68.3	5.01	4	1901.8	66.9	5.02
5,969	Σ 1581	11 52 14	+45 57	8.3, 9.5	1907.9	173.0	2.18	2	1832.7	170.6	2.23
* 5,970	OΣ 241	11 52 26	+35 51	6.5, 8.4	1910.8	129.5	1.47	7	1849.3	119.1	1.36
5,973	Σ 3076	11 52 48	- 4 49	9.3, 9.8	1908.8	53.9	6.05	2	1831.6	51.3	5.37
5,971	Σ 1585	11 52 49	+41 26	8.0, 11.0	1907.4	106.9	5.25	1	1832.4	104.6	5.53
5,975	Σ 1586	11 53 2	+40 45	8.3, 11.0	1900.0 19.4	251.2 248.1	1.57 1.51	4 2	1832.8	247.4	1.81
5,980	Hu. 733	11 54 11	+48 27	8.5, 10.3	1908.5	162.3	1.61	1	1904.8	160.8	1.90
5,985	Ho. 534	11 55 37	+21 16	8.4, 11.4	1906.3	139.0	9.87	2	1897.4	137.2	9.76
5,996	Σ 1589	11 56 46	+44 1	9.0, 9.5	1907.4 19.5	161.3 159.8	1.94 2.29	1 2	1832.8	155.8	2.27
13,222	Hu. 890	11 57 32	+11 45	9.0, 10.0	1907.0	64.0	1.52	4	1905.2	65.2	1.54
6,007	Ho. 535	11 58 40	+22 10	8, 12	1906.3 12.3	139.6 141.6	2.18 2.43	3 4	1897.4	146.4	2.01
6,013	Σ 1593	11 59 41	- 2 3	8.3, 8.3	1908.3 15.3	192.3 194.0	1.27 1.52	1 1	1829.3	198.2	1.43
6,015	A. 681	11 59 55	+25 30	8.9, 9.3	1910.6	126.7	0.49	7	1904.3	131.4	0.39
6,016	A. 682	12 0 22	+24 32	7.5, 9.0	1911.4	333.4	0.43	3	1904.3	333.3	0.39
* 6,030	Σ 1601	12 2 20	+39 15	8.5, 9.7	1899.3 1911.9 19.5	311.7 311.0 310.7	2.29 2.18 2.11	3 9 2	1832.1	319.3	2.45
6,034	Ho. 255	12 3 5	+20 55	8.2, 12.3	1905.4	133.2	2.15	1	1887.3	133.4	2.45
6,045	Σ 3078	12 5.28	+11 43	8.2, 11.0	1909.8	304.1	9.60	2	1830.3	305.9	9.41

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 6,053	Σ 1606	h m s 12 7 1	$^{\circ}$ ' +40 19	6.3, 7.0	1896.7 1903.9 12.5 19.5	$^{\circ}$ 333.7 328.7 327.0 326.5	" 0.99 1.11 0.96 0.73	8 12 11 2	1831.5	$^{\circ}$ 348.6	" 1.39
6,075	Σ 1612	12 8 46	+11 11	9.2, 9.7	1907.3	7.9	5.55	2	1829.3	8.1	5.70
* 6,076	Σ 1613	12 8 47	+36 11	8.5, 8.8	1899.3 1912.4	13.0 10.9	1.27 1.28	3 12	1832.0	18.5	1.64
6,079	Hu. 569	12 9 59	+22 8	9.0, 11.5	1908.3	154.0	1.03	1	1902.4	152.9	1.12
6,080	Hu. 570	12 9 59	+21 43	8.8, 13.0	1908.6	108.7	2.42	4	1902.4	104.0	2.54
* 6,090	Σ 1619	12 11 18	- 6 50	7.5, 7.8	1909.7	278.6	7.49	3	1829.7	287.6	7.79
6,095	Σ 1620	12 11 59	+ 9 27	8.5, 10.3	1909.8	78.6	2.07	4	1830.3	79.9	1.94
* 6,097	Σ 1621	12 12 12	+ 6 4	8.8, 10.3	1898.3 1906.3 14.3	134.2 136.0 141.2	2.47 2.38 1.96	2 4 5	1830.3	124.0	3.44
6,106	A.G. 176	12 12 59	+30 29	9.0, 9.2	1909.5	178.2	2.69	5	1903.4	177.7	2.48
6,109	β 796	12 13 37	+ 7 1	8.0, 8.8	1908.3	271.5	0.47	1	1881.3	270.9	0.31
13,226	Hu. 1138	12 14 5	+12 12	9.5, 9.9	1912.3	359.6	1.22	5	1905.3	3.4	1.32
6,133	Ho. 52	12 16 55	+18 12	5, 13	1899.4	44.3	8.90	2	1883.7	43.5	9.08
6,135	Σ 1634	12 16 56	+23 20	8.1, 9.9	1911.2	147.5	5.26	9	1830.8	148.8	5.24
6,136	Ho. 536	12 16 57	+35 25	8.5, 9.7	1905.0	98.6	3.63	3	1896.9	95.5	3.28
6,141	Hu. 737	12 17 42	+ 3 58	9.0, 9.3	1910.4 19.4	46.9 46.3	2.45 2.64	2 3	1900.2	47.2	2.70
6,151	Ho. 53	12 19 46	+14 20	8.0, 11.7	1905.8	296.2	2.16	4	1883.0	295.3	1.89
* 6,158	Σ 1639	12 20 40	+26 0	6.7, 7.9	1895.24 97.02 99.07 1901.4 04.0 08.5 13.2 19.4	97.1 14.3 5.4 358.5 356.9 348.2 344.1 339.9	0.28 0.21 0.22 0.26 0.34 0.42 0.49 0.59	1 3 4 12 7 16 21 2	1836.5	292.8	1.18
6,159	$O\Sigma$ 250	12 20 43	+43 30	7.7, 8.0	1893.4	333.4	0.42	5	1846.0	330.7	0.44
6,160	A.G. 177	12 20 53	+ 2 50	9.0, 10.0	1911.8	218.3	7.77	2	1902.4	216.6	6.35
6,167	β 922	12 22 17	- 4 4	8.1, 8.9	1914.3	156.8	0.71	1	1891.3	165.3	0.74
6,166	Σ 1642	12 22 17	+45 9	8.0, 8.8	1913.4	182.2	2.68	3	1832.8	183.2	2.80
6,168	Hu. 13	12 22 35	- 1 28	8.1, 8.4	1914.3	155.5	1.04	1	1881.3	153.2	1.40
* 6,174	Σ 1643	12 23 28	+27 27	8.4, 8.7	1897.3 1903.5 12.5 19.4	40.4 38.4 34.5 27.2	1.97 2.10 2.10 2.08	9 28 16 2	1830.4	71.2	1.94
6,182	β 1324	12 25 47	+29 56	9.3, 9.9	1910.8	221.5	2.58	7	1904.2	223.3	2.50

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 6,187	Σ 1647	h m s 12 26 45	° ' " +10 8	7.5, 7.8	1897.4 1902.1 07.8 12.2 19.4	° 221.0 221.8 223.7 225.4 223.7	" 1.18 1.43 1.51 1.34 1.73	11 14 15 14 4	1830.1	° 202.4	" 1.19
6,191	A.G. 178	12 27 10	+ 2 30	8.5, 8.8	1904.3	289.0	1.44	1	1901.4	287.2	1.32
6,196	Σ 1651	12 28 0	+27 26	8.1, 9.9	1909.3	216.3	6.80	2	1830.8	218.4	6.60
6,199	Hu. 571	12 28 32	+20 25	8.8, 8.8	1903.9	80.2	0.33	2	1902.5	81.1	0.26
6,201	A.G. 179	12 29 0	+23 24	9.0, 10.0	1904.3 13.4	136.0 134.5	1.15 0.81	1 3	1902.5	136.4	0.91
6,209	β 797	12 30 44	+ 6 23	8.5, 8.6	1903.3	166.2	0.60	3	1881.3	171.2	0.73
6,210	Ho. 539	12 30 44	+34 35	8, 10	1904.4	185.1	1.03	1	1896.3	181.2	0.77
* 6,211	Σ 1658	12 31 17	+ 7 52	8.0, 9.8	1897.2 1903.5 14.3 19.4	358.2 358.9 2.2 2.0	2.55 2.38 2.67 2.75	12 12 4 1	1830.6	341.5	2.02
* 6,216	Σ 1661	12 32 13	+11 49	8.5, 8.5	1900.9 09.9 19.4	238.4 240.9 240.5	2.50 2.34 2.34	14 4 3	1828.7	226.0	2.56
* 6,222	Σ 1663	12 33 27	+21 37	7.8, 8.7	1897.5 1902.0 11.2 19.4	105.4 102.5 100.9 97.4	0.65 0.64 0.62 0.68	14 17 13 1	1830.4	116.8	0.81
6,233	Σ 1666	12 35 24	+14 44	7.9, 10.0	1909.3	189.4	7.29	2	1830.1	189.8	7.10
6,236	Σ 1668	12 37 7	+ 9 14	7.5, 8.0	1910.5	193.8	1.66	5	1830.0	196.9	1.70
6,238	β 607	12 37 21	- 1 3	8.8, 11.0	1908.4	316.9	0.82	1	1878.2	315.8	1.16
* 6,243	Σ 1670	12 37 56	- 1 2	3.0, 3.0	1898.7 1914.3 †17.4 19.4	329.7 325.2 323.9 322.1	5.84 5.83 6.22 6.19	15 7 4 3	1825.3	277.9	2.37
6,244	Ho. 54 BC	12 38 2	+10 18	10, 10	1906.3	142.7	2.14	1	1882.4	151.0	1.48
	BD			13.6	1906.3	64.6	10.44	1	1904.1	62.6	10.82
6,245	β 924	12 38 9	+ 7 13	5.8, 11.6	1908.8	29.0	3.89	2	1880.1	29.0	3.66
13,230	Hu. 892	12 38 28	+14 56	9.3, 9.3	1908.3	160.0	0.94	10	1905.2	163.4	0.96
6,250	Σ 1672	12 39 1	+34 13	8.0, 9.2	1911.5	313.9	4.22	1	1832.3	314.1	4.15
6,253	Σ 1674	12 40 0	+ 7 58	8.5, 9.2	1909.6	171.9	2.25	8	1829.7	174.4	2.35
6,258	Ho. 256	12 40 41	+36 11	7.0, 9.0	1902.9	119.6	0.60	2	1887.4	101.9	0.5±
13,231	Hu. 893	12 44 13	+12 42	9.1, 9.1	1908.9	32.7	1.46	13	1905.2	32.6	1.42
6,271	β 459	12 44 16	+ 3 52	8.2, 11.5	1909.4	292.1	4.05	1	1877.9	289.5	3.80

† Measures made by R. Jonckheere at the Royal Observatory, Greenwich (A. J., vol. xxxi., No. 735).

β .G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
6,276	Hn. 117	h m s	° ' "	9.1, 9.5	1908.9	15.6	2.29	4	1888.4	16.8	2.39
6,277	Σ 1680	12 45 32	+22 11	8.8, 11.0	1910.9	338.7	2.90	2	1830.7	341.4	3.01
6,281	Hu. 640	12 47 1	+20 56	9.5, 9.5	1910.03	122.2	0.37	3	1902.54	94.5	0.39
13,234	Hu. 894	12 49 33	+13 35	9.1, 9.1	1908.4	142.3	1.00	10	1905.2	146.3	0.98
* 6,296	Σ 1687	12 49 36	+21 39	5.0, 7.8	1897.2 1903.1 12.8 19.4	75.6 85.2 91.1 99.6	1.21 1.14 1.12 1.09	17 23 13 6	1830.0	25.3	1.43
	AC			9.0	1900.1 14.9	125.8 124.9	28.81 28.59	4 2	1830.2	124.7	28.60
* 6,312	$O\Sigma$ 256	12 52 35	- 0 33	7.2, 7.6	1894.9 1902.2 07.9 14.4 19.4	84.2 76.6 76.1 79.7 82.0	0.58 0.59 0.65 0.66 0.67	4 6 5 5 1	1848.7	57.2	0.66
6,316	Ho. 538	12 52 52	+21 25	8.7, 12	1904.4	121.0	2.55	1	1894.4	117.8	2.10
6,318	Σ 1695	12 53 40	+54 31	6.3, 8.2	1913.8	285.3	3.27	2	1832.1	289.1	3.26
6,324	Σ 1696	12 53 48	+30 46	8.0, 8.2	1910.4	203.0	3.42	4	1832.6	202.5	3.60
* 6,329	Σ 1699	12 55 5	+27 53	7.8, 7.8	1912.4	3.3	1.46	19	1830.4	1.2	1.47
6,330	Σ 1700	12 55 5	+27 31	8.2, 10.0	1910.4	83.0	7.22	5	1831.3	83.4	7.07
6,343	β 1081	12 56 42	+31 11	4.5, 13.8	1901.4	343.0	5.26	1	1889.1	351.3	5.15
6,342	A. G. Clark 5	12 56 44	- 2 58	6, 11	1909.4	154.6	1.14	1	1876.4	159.2	1.28
6,344	Hn. 14	12 56 56	+ 3 16	8.3, 10.5	1911.3	263.0	2.62	2	1881.4	262.2	2.81
6,345	β 112	12 56 59	+18 46	9.6, 10.0	1898.8 1910.9	293.9 293.6	2.09 2.02	8 2	1875.1	292.4	1.75
* 6,348	β 1082	12 57 31	+56 46	6.0, 9.6	1899.1	89.2	1.24	5	1889.2	74.6	1.50
6,351	Barnard 6	12 58 45	+15 57	9.1, 9.1	1909.9	43.6	2.69	4	1895.3	41.3	2.97
6,354	Σ 1709	12 58 52	+23 55	7.1, 9.9	1909.4	250.7	2.50	7	1831.8	249.3	2.17
* 6,358	Σ 1711	12 59 9	+13 52	8.5, 9.0	1898.4 1904.8 13.4 19.4	350.3 347.0 344.9 354.2	0.90 0.91 0.91 0.74	10 17 8 1	1829.4	355.9	1.43
6,360	Σ 1710	12 59 12	+10 50	8.7, 10.0	1909.4	261.6	2.67	1	1828.4	266.3	2.21
6,362	β 928	12 59 29	- 6 2	7.8, 8.7	1908.9	309.7	1.95	2	1880.3	313.2	1.83
6,363	β 341	12 59 56	-20 11	6.2, 6.7	1914.4	312.1	0.76	3	1877.0	316.2	0.83
* 6,369	Σ 1714	13 0 0	+24 2	8.8, 9.2	1912.8	306.3	3.15	11	1832.6	311.0	3.03
* 6,367	β 929	13 0 2	- 3 16	6.2, 6.2	1901.3 12.5 19.4	218.0 214.7 209.0	0.52 0.60 0.50	9 8 1	1879.4	229.4	0.48
6,368	Σ 1712	13 0 6	+ 9 52	9.0, 9.4	1914.3	331.5	9.14	2	1828.8	336.6	8.57

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 6,373	Σ 1716	h m s	° ′			°	"			°	"
		13 0 44	+ 9 3	8.1, 10.9	1909.4	144.3	2.50	1	1831.1	151.3	2.60
6,379	H. 220=Ho. 539	13 1 48	+15 7	7.5, 11.8	1906.3	43.8	17.65	2	1831+	41.7	15±
6,381	Ho. 257	13 2 15	+26 38	8.8, 8.9	1906.7	154.3	2.06	7	1887.3	155.3	1.80
* 6,386	β 930	13 2 30	+45 40	6.0, 12.3	1899.5 1913.5	118.6 119.2	2.85 2.73	3 1	1879.3	109.2	2.68
13,239	Hu. 1143	13 2 41	+12 20	8.9, 9.6	1912.7	96.6	1.03	3	1905.3	95.0	0.97
6,385	β 1083 AB	13 2 36	+29 25	6, 11.5	1898.3	220.3	6.18	3			
	A, BC				1899.7	223.1	6.83	3	1830+	209.6	6±
	BC			11.5, 11.7	1899.1	234.6	0.46	4	1889.1	237.3	0.49
6,388	† Lewis 12	13 2 45	+27 18	9.0, 9.5	1898.9 1900.9 04.5	192.4 200.9 194.7	0.35 0.41 0.50	2 2 2			
* 6,395	OΣ 260	13 4 28	+27 20	7.9, 8.3	1898.6 1902.2 11.7	123.8 121.1 128.5	0.59 0.58 0.78	11 13 4	1845.8	111.3	0.75
6,404	Hu. 572	13 5 30	+21 51	8.0, 9.0	1904.0	352.0	0.40	5	1902.5	348.6	0.41
6,405	Σ 1724	13 6 3	- 5 9	4.0, 9.0	1909.4 15.3	345.7 345.7	6.97 7.08	1 1	1830.3	344.0	7.07
	AC			9.5	1915.3	297.6	71.71	1	1782.3	294.9	63.88
6,407	Σ 1727	13 6 20	+31 46	8.7, 10.2	1914.4	333.5	7.30	1	1831.3	335.0	7.26
* 6,406	Σ 1728	13 6 23	+17 55	6.0, 6.0	1893.40 96.33 97.34 98.39 99.31 1900.42 01.37 02.30 03.29 04.42 05.36 08.35 09.36 10.40 12.38 13.34 14.36 15.37 †16.37 †17.38 19.36	199.5 201.1 350.1 23.7 6.3 22.3 16.4 13.5 14.1 17.4 13.5 11.4 12.4 7.3 192.4 191.1 192.1 195.2 193.2 192.4 192.1	0.47 0.15 0.07 0.17 0.23 0.27 0.27 0.40 0.39 0.36 0.54 0.46 0.42 0.33 0.25 0.26 0.38 0.48 0.60 0.42 0.33	2 1 1 2 5 5 5 5 4 3 2 4 3 1 4 3 5 2 1 3 1	1827.28	10.9	0.57
6,409	β 609	13 6 49	- 4 33	7.0, 11.0	1909.4	1.2	0.72	1	1878.3	356.1	0.89
6,411	β 931	13 7 5	+13 42	6.7, 11.8	1909.4	202.6	5.12	1	1879.3	204.9	4.89

† B.D. + 27° 2214.

† Measures by R. Jonckheere (*A. J.*, vol. xxxi., No. 735).

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
* 6,415	O Σ 261	13 8 30	+32 29	6.9, 7.4	1893.4 98.8 1901.4 04.1 07.9 11.1 14.0 19.5	344.2 346.1 344.2 346.8 344.7 344.5 344.2 344.5	1.34 1.34 1.47 1.59 1.69 1.66 1.79 1.66	3 8 8 6 8 8 8 3	1843.8	359.2	0.63
6,417	Σ 1730	13 8 37	+37 19	8.4, 10.1	1912.4	335.6	1.76	5	1832.5	335.0	1.72
6,418	Hu. 573	13 8 53	+23 19	8.8, 13.0	1903.4	174.6	2.38	2	1902.5	173.4	2.51
6,438	Σ 1733	13 12 39	+17 39	8.2, 9.8	1898.9 1919.4	126.5 126.3	4.88 4.90	6 1	1828.0	125.0	4.58
* 6,442	β 800	13 13 4	+17 26	7.1, 10.2	1898.3 1902.9 09.5 13.9 19.4	115.1 113.0 111.7 109.3 111.5	2.51 2.78 3.20 3.59 3.93	10 10 6 10 1	1881.4	121.5	1.27
6,441	A.G. 186	13 13 4	+ 2 35	9.0, 10.1	1909.9	306.1	3.50	2	1903.1	306.9	3.38
6,446	O Σ 263	13 13 27	+50 58	7.7, 8.5	1914.5	134.6	1.93	1	1846.8	133.0	2.26
* 6,455	Σ 1734	13 16 53	+ 3 20	7.2, 7.9	1897.1 1903.1 12.2	191.0 191.2 187.3	1.06 1.12 1.03	6 7 5	1830.4	198.1	0.73
6,454	Hu. 644	13 17 13	+48 11	8.4, 9.2	1911.5	87.7	1.38	1	1904.3	99.0	0.91
6,470	Ho. 259	13 19 3	+26 31	7 , 13	1906.1	242.4	9.90	7	1887.4	242.5	9.70
* 6,476	Ho. 260	13 20 6	+29 37	8.3, 8.5	1901.6 06.3 12.2 19.5	319.9 321.1 328.9 339.4	0.67 0.77 0.63 0.52	15 10 10 1	1887.4	298.8	0.62
6,478	Σ 1742	13 20 29	+ 1 48	7.4, 7.9	1897.1 1903.6 14.4	350.8 352.4 350.9	1.24 1.20 1.47	3 5 1	1831.9	351.1	1.30
6,490	β 237	13 23 12	+14 46	8.3, 10.3	1910.0 14.2	203.5 204.6	2.91 2.80	3 5	1875.3	202.3	2.95
6,491	A.G. 187	13 23 34	+20 51	9.5, 9.5	1904.4 09.8	122.6 118.1	1.69 1.49	2 4	1902.5	121.2	1.64
* 6,494	O Σ 266	13 24 47	+16 6	7.3, 7.8	1895.0 98.4 1902.2 10.4 13.5 19.4	337.3 339.6 339.9 342.6 343.3 346.0	1.53 1.57 1.63 1.63 1.78 2.00	5 7 8 6 10 3	1846.1	324.2	1.16
6,497	A.G. 188	13 25 8	+23 57	8.8, 12	1914.4	243.8	4.55	1	1902.4	247.5	2.88
* 6,500	β 113	13 25 24	+11 52	8.5, 11.0	1904.6 12.1 19.4	206.5 212.8 216.3	1.53 1.57 1.40	4 3 1	1875.3	188.8	1.57
6,502	Σ 1748	13 25 29	+22 34	8.0, 11.0	1914.4	182.6	5.98	1	1832.3	179.6	5.48
* 6,510	Σ 1752	13 26 5	+60 19	8.0, 10.0	1899.5	141.4	1.33	1	1832.2	149.4	1.63

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
6,511	Σ 1751	h m s	° ′			°	"			°	"
		13 26 56	+ 9 42	7.5, 10.7	1914.4	58.4	5.68	1	1831.9	58.9	5.69
6,522	Σ 1755	13 29 1	+37 12	7.0, 7.9	1899.4	131.3	4.31	1	1832.2	133.8	4.28
* 6,524	OΣ 269	13 29 28	+35 17	6.5, 7.0	1898.6	215.9	0.29	8	1844.3	218.0	0.33
					1901.8	215.4	0.30	12			
					08.3	221.6	0.31	6			
					11.8	222.1	0.28	8			
					14.0	221.0	0.28	8			
					19.5	219.7	0.25	2			
* 6,527	Σ 1758	13 29 46	+49 31	8.0, 8.2	1899.4	302.9	3.71	1	1832.1	311.4	4.21
6,531	Σ 1759	13 30 15	+27 50	8.5, 10.2	1912.4	152.0	10.06	4	1831.8	153.7	9.78
* 6,530	Σ 1757	13 30 27	+ 0 4	7.8, 8.9	1895.4	79.5	2.47	3	1831.8	21.0	1.54
					1903.9	80.5	2.48	4			
					13.4	83.9	2.36	3			
					19.4	88.0	2.46	1			
6,535	Ku. 45	13 30 29	+15 39	9.8, 10.0	1910.9	295.8	0.94	2	1902.5	291.5	0.98
6,534	β 932	13 30 42	-12 50	6.1, 6.6	1913.7	82.9	0.26	3	1879.4	81.2	0.47
6,536	Σ 1760	13 30 52	+26 39	8.0, 8.0	1913.2	64.7	8.62	9	1831.1	65.0	8.52
6,541	β 933	13 31 12	+33 31	8.4, 8.8	1914.0	27.6	2.24	5	1879.8	30.7	1.88
6,554	A.G. 190	13 32 39	+50 2	8.9, 9.1	1914.5	12.0	2.30	1	1902.3	9.2	3.17
6,555	Krueger 42	13 32 46	+60 18	9.5, 9.6	1914.5	218.0	3.38	1	1891.3	217.4	3.81
* 6,566	Σ 1768	13 34 8	+36 40	5.7, 7.6	1898.5	134.1	0.96	11	1831.5	76.0	1.07
					1902.1	130.6	1.11	13			
					13.3	123.2	1.34	11			
6,572	β 934	13 34 39	+50 50	9.0, 9.2	1914.5	269.7	1.36	1	1879.3	264.1	1.04
* 6,571	Σ 1769	13 34 49	+39 33	7.3, 9.7	1913.0	30.2	2.12	5	1832.3	24.1	2.84
6,576	Hu. 645	13 35 23	+21 50	9.5, 9.5	1907.9	20.8	0.89	2	1902.5	21.2	0.88
					11.4	18.2	0.70	3			
* 6,578	β 612	13 35 54	+11 7	6.0, 6.0	1893.47	193.1	0.39	1	1878.33	56.1	0.23
					95.35	210.6	0.52	2			
					96.41	212.1	0.34	2			
					97.37	223.9	0.32	2			
					98.38	217.6	0.42	3			
					99.39	221.8	0.36	2			
					1900.43	227.3	0.31	1			
					01.44	229.3	0.27	3			
					02.34	246.5	0.27	2			
					03.40	246.4	0.23	5			
					12.38	181.2	0.19	4			
					13.36	194.5	0.21	6			
					14.42	194.9	0.23	6			
					15.36	210.4	0.30	2			
					† 17.07	214.3	0.29	3			
					19.40	214.9	0.25	1			
* 6,586	Σ 1772	13 37 6	+20 20	6.2, 9.1	1899.4	140.9	4.68	1	1831.6	148.7	4.83
					1919.4	139.7	4.60	1			

† Measures by R. Jonckheere (*A. J.*, vol. xxxi., No. 735).

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"			°	"
* 6,599	Σ 1777	13 39 19	+ 3 55	5.8, 8.2	1895.7 1903.4	231.7 230.0	3.33 3.37	4 2	1828.8	235.4	3.39
6,609	Σ 1779	13 41 3	+24 2	8.5, 9.8	1908.4	147.1	4.16	3	1832.4	147.0	3.82
6,616	β 115	13 41 38	+ 9 26	8.0, 11.5	1909.4	223.5	1.46	1	1877.4	224.4	1.42
* 6,619	Σ 1781	13 42 21	+ 5 29	7.8, 8.2	1895.9 1903.4 13.4 19.4	276.6 279.5 285.9 287.1	1.18 0.98 0.90 0.80	7 3 5 2	1830.3	240.4	1.36
6,626	Σ 1783	13 42 52	+41 24	7.8, 10.0	1912.5	49.2	2.34	3	1832.7	50.4	2.10
6,625	β 801	13 42 56	+11 12	8.1, 10.9	1904.8 09.7	326.6 325.7	2.67 2.59	5 3	1881.3	328.0	2.76
* 6,641	Σ 1785	13 45 53	+27 21	7.2, 7.5	1896.64 99.15 1901.03 02.87 05.07 08.36 11.88 13.38 14.57 † 17.44 19.41	263.3 272.5 280.4 287.4 298.3 318.2 329.3 334.8 338.9 353.5 2.8	1.38 1.27 1.33 1.40 1.52 1.38 1.64 1.41 1.38 1.38 1.32	4 5 5 8 8 1 2 4 3 2 5	1830.12	164.4	3.49
6,656	β 613	13 47 15	+35 3	9.0, 9.0	1899.1 1903.5	146.7 149.6	0.67 0.94	3 1	1878.4	146.2	0.78
6,667	Ku. 47	13 50 41	+32 31	9.5, 10.2	1909.4	119.2	2.01	1	1901.4	100.2	1.90
* 6,668	Σ 1788	13 50 58	- 7 41	6.7, 7.9	1899.4 1903.4 19.5	79.6 81.2 85.0	2.75 2.32 3.51	1 1 1	1831.4	54.0	2.36
* 6,671	OΣ 272	13 51 3	+30 17	7.0, 9.9	1908.5 19.5	11.1 13.0	1.86 1.92	3 1	1849.6	23.5	1.89
6,676	OΣ 273	13 52 34	+ 5 40	7.5, 8.0	1908.7	110.1	1.00	3	1846.0	106.1	0.74
6,683	Σ 1792	13 53 24	+12 49	8.9, 10.1	1908.6	292.6	2.00	4	1825.8	294.9	1.91
6,687	β 937	13 53 50	+34 48	8.1, 8.3	1910.8 14.1 19.5	114.0 115.9 115.9	0.81 0.86 0.62	5 6 1	1880.4	104.8	0.94
6,690	β 30	13 54 34	+19 50	8.2, 11.5	1901.2	200.3	8.56	4	1875.3	199.8	7.82
6,696	Σ 1795	13 56 10	+53 27	7.0, 10.2	1914.5	2.3	7.59	1	1832.1	3.2	7.61
13,256	A. 687	13 56 50	+28 48	9.2, 9.3	1911.7	309.7	0.86	7	1904.3	306.6	0.80
6,702	A. 569	13 57 45	+25 43	9.0, 9.3	1911.4	110.9	0.51	7	1903.4	103.1	0.50
6,710	Swift	13 59 27	+46 42	9.0, 9.0	1914.5	11.3	2.75	2	1889.4	6.7	2.44
6,709	A.G. 192	13 59 55	+ 3 4	9.0, 10.0	1909.9	187.4	2.13	2	1902.8	186.8	1.82

† Measures by R. Jonckheere (*A. J.*, vol. xxxi., No. 735).

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 6,711	β 1270	h m s	° ′			°	"			°	"
		14 0 0	+ 8 51	8.2, 8.3	1896.40	356.2	0.43	1	1892.27	329.7	0.27
					97.41	346.0	0.27	1			
					98.44	342.8	0.44	3			
					1901.51	15.1	0.31	1			
					02.7	round		3			
					03.40	23.1	0.17	2			
					13.38	131.0	0.11	1			
* 6,725	Σ 1802	14 3 59	-12 34	8.0, 9.3	1899.4	280.3	4.98	1	1830.6	285.5	4.22
					1913.2	282.5	5.29	1			
6,728	A. 346	14 4 24	+25 5	8.6, 9.6	1912.9	336.9	0.68	2	1902.6	337.4	0.62
6,731	OΣ 276	14 5 1	+37 6	7.5, 8.3	1912.7	194.7	0.53	11	1845.7	196.1	0.58
	AB, C			10.0	1911.1	72.8	9.58	3	1846.3	73.4	9.50
6,738	Σ 1806	14 5 56	+48 51	9.0, 10.0	1914.5	175.0	13.13	1	1831.8	173.5	13.19
6,739	Σ 1809	14 6 0	+46 29	8.5, 11.7	1914.5	199.1	4.85	1	1832.1	196.7	4.14
* 6,746	Σ 1808	14 6 46	+26 57	8.0, 9.0	1897.5	73.8	2.94	8	1832.3	68.8	2.82
					1902.4	75.3	2.75	10			
6,752	Σ 1810	14 8 13	+28 23	8.4, 9.0	1899.3	176.2	1.97	3	1832.4	173.8	1.81
6,754	Σ 1814	14 8 18	+50 36	8.5, 9.0	1914.5	257.0	10.77	1	1831.5	256.2	11.03
* 6,758	OΣ 277	14 9 7	+29 4	7.8, 8.0	1910.8	0.8	0.36	7	1845.9	333.7	0.42
					13.6	1.7	0.37	7			
	AB, C=Σ 1812			9.3	1909.8	108.4	14.14	3	1832.4	108.2	14.19
* 6,764	OΣ 278	14 9 18	+44 32	7.5, 7.7	1899.9	90.9	0.29	7	1846.0	146.0	0.41
					1901.8	90.8	0.29	6			
					06.1	86.8	0.26	7			
					11.1	73.9	0.28	7			
					13.4	70.3	0.31	8			
* 6,766	β 224	14 9 49	+12 55	8.9, 9.3	1911.7	59.0	0.51	4	1875.6	71.0	0.71
6,770	OΣ 279	14 10 11	+12 21	6.8, 9.0	1908.9	253.9	2.13	4	1845.7	248.4	2.28
* 6,776	Σ 1820	14 10 35	+55 40	8.2, 8.5	1900.5	74.9	2.05	2	1832.0	46.7	2.40
					14.5	84.4	2.02	2			
6,772	Σ 1816	14 10 36	+29 27	7.0, 7.1	1899.4	84.1	1.32	2	1831.3	80.1	1.87
* 6,773	Σ 1817	14 10 51	+27 3	8.0, 8.6	1899.3	2.5	1.19	3	1832.2	7.0	1.55
* 6,780	Σ 1819	14 11 34	+ 3 28	7.9, 8.0	1897.5	2.4	1.29	7	1830.4	84.9	0.98
					1903.3	359.8	1.29	8			
					12.5	346.1	1.24	9			
					† 17.4	343.4	1.12	2			
					19.4	340.3	1.41	4			
6,789	Σ 1826	14 12 22	+47 19	8.2, 9.2	1913.5	316.4	4.25	3	1832.1	315.1	4.43
	AC				1914.5	355.0	43.50	2			
6,785	Σ 1824	14 12 36	+ 6 25	8.0, 10.0	1912.8	280.3	5.36	5	1830.0	282.6	5.32
6,797	Σ 1829	14 12 44	+50 47	7.7, 8.2	1913.5	151.3	5.40	3	1831.1	150.3	5.30
6,791	Howe 32	14 12 49	+23 42	8.5, 10.5	1910.4	192.7	4.60	11	1879.4	193.7	5.42

† Measures by R. Jonckheere (*A. J.*, vol. *xxxi*, No. 735).

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
6,799	Σ 1828	h m s	° ' "			°	"			°	"
6,807	A. 147	14 13 33	+24 32	9.2, 9.2	1908.5	158.2	2.17	2	1833.1	160.1	1.94
6,812	β 1271	14 14 24	+51 20	8.5, 9.8	1911.5	103.6	0.62	1	1901.3	106.6	0.48
6,813	β 1272	14 14 35	+54 53	6.8, 12.0	1911.5	352.3	2.90	1	1892.4	355.2	2.81
		14 15 2	+49 5	8.4, 9.5	1898.5	131.9	1.29	6	1892.2	132.5	1.25
					1901.3	134.5	1.41	5			
					14.5	134.0	1.10	3			
	AC			8.6	1900.1	321.0	23.91	2	1892.2	321.8	23.67
					14.5	321.7	23.58	3			
6,810	Σ 1832	14 15 6	+ 4 14	9.0, 9.0	1902.4	133.4	0.61	4	1830.3	118.3	0.44
	AC			10.5	1903.4	70.7	20.50	2	1828+	65.5	12 \pm
6,817	β 1273	14 15 43	+48 15	8.6, 9.8	1899.3	191.5	1.04	8	1892.2	193.0	1.08
6,818	Σ 3083	14 16 15	+23 51	8.3, 11.0	1909.1	228.8	4.72	3	1832.7	230.3	4.55
6,820	O Σ 281	14 16 39	+ 8 55	7.3, 10.8	1908.4	160.9	1.70	3	1847.7	161.5	1.25
6,824	Ho. 541	14 17 2	+12 30	9.3, 10.2	1906.7	93.0	2.13	7	1896.4	87.0	1.91
					11.8	94.6	2.28	7			
* 6,832	Σ 1834	14 17 34	+48 50	7.1, 7.2	1893.47	145.5	0.39	1	1831.20	113.7	1.36
					97.51	166.5	elongated	1			
					97.63	round.		1			
					99.45	200.0	elongated	1			
					1901.27	215.0	0.20	4			
					02.73	118.2	0.29	1			
					05.34	21.4	0.15	1			
					06.43	2.2	0.14	1			
					07.32	343.2	0.14	2			
					08.58	358.9	0.13	1			
					09.68	106.6	0.12	2			
					10.28	98.5	0.22	2			
					11.46	85.7	0.17	5			
					12.46	91.1	0.16	3			
					13.52	105.7	0.18	2			
					14.50	102.9	0.15	2			
					15.44	97.4	0.20	3			
					19.62	94.9	0.28	1			
6,836	Espin 19	14 17 50	+52 0	9.0, 10.3	1914.5	49.4	1.40	2	1902.2	47.3	1.71
	AC			9.0	1914.5	170.4	40.76	2	1902.2	170.3	40.84
6,841	Σ 1839	14 18 56	+54 15	8.3, 8.3	1914.5	82.1	14.65	1	1831.5	81.9	14.42
13,270	A. 1104	14 19 23	+57 50	9.0, 9.0	1909.4	273.8	0.92	1	1905.3	271.6	0.77
6,846	β 615	14 19 31	+48 52	8.5, 9.5	1914.5	235.6	2.93	2	1878.3	237.1	2.35
* 6,842	β 1111 BC	14 19 42	+ 8 47	8.4, 8.4	1898.42	356.5	0.30	1	1889.40	135.3	0.19
					99.30	28.8	0.25	1			
					1903.42	36.9	0.25	1			
					09.43	56.9	0.15	1			
					12.32	70.1	0.27	1			
					15.46	131.6	0.15	2			
	A, BC= Σ 1835			5.5, 6.8	1898.6	190.0	6.55	4	1832.1	186.5	6.06
					1903.9	190.2	6.49	2			
					11.9	188.0	6.30	4			

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 6,851	Σ 1837	h m s	° ' "			°	"			°	"
		14 20 39	-11 19	7.1, 8.7	1898.4 1913.4	303.0 306.3	1.05 1.34	3 1	1829.8	326.9	1.41
13,273	A. 1105	14 24 2	+30 59	9.1, 9.4	1906.4 13.1	185.6 185.1	1.01 0.89	3 9	1905.4	191.0	0.87
6,879	Ho. 542	14 24 4	+20 57	8.8, 8.8	1907.3 13.4	258.7 257.3	0.58 0.60	5 2	1896.4	273.6	0.49
6,880	Σ 1846	14 24 21	- 1 53	5.2, 9.7	1899.4 1914.4	110.3 112.4	4.29 4.73	1 1	1829.7	108.8	3.73
6,882	Ho. 543	14 24 25	+21 44	8.5, 8.5	1906.8	237.8	4.65	4	1896.3	234.7	4.23
6,893	Σ 1853	14 26 22	+ 6 37	8.7, 9.3	1912.7	84.5	2.59	3	1830.0	86.4	2.73
6,904	A.G. 195	14 27 56	+ 2 10	9.1, 9.3	1913.4	159.4	2.13	1	1902.7	160.1	1.62
6,909	Σ 3086	14 28 47	+17 38	9.0, 10.0	1910.3	270.4	6.03	8	1831.0	270.9	5.74
* 6,913	A. 570	14 29 2	+27 1	6.3, 6.5	1908.50 10.36 11.44 12.56 14.45 15.37	162.4 143.3 117.1 114.4 97.8 85.6	0.22 0.19 0.23 0.22 0.20 0.25	2 2 3 7 5 2	1903.40	198.6	0.20
6,916	Ho. 387	14 29 26	+20 29	8.7, 11.5	1907.0	240.0	9.31	3	1892.4	241.4	9.22
6,927	A. G. Clark 6	14 30 42	+30 9	9.5, 10.0	1904.5	317.2	0.65	3	1877.0	319.8	0.75
6,931	β 941	14 31 56	+ 0 34	8.2, 8.2	1913.4	213.5	0.55	1	1879.3	218.3	0.80
6,933	Hu. 574	14 31 59	+19 36	8.5, 8.8	1903.4	105.7	0.24	2	1902.5	102.5	0.29
6,936	Σ 3087	14 32 47	+19 44	9.5, 9.5	1908.6	45.0	1.82	5	1833.1	49.2	1.65
* 6,948	Σ 1863	14 35 31	+51 54	7.1, 7.4	1901.1 11.5	89.2 86.3	0.65 0.62	10 7	1830.1	109.7	0.65
13,277	A. 1107	14 36 22	+ 5 23	8.0, 9.2	1909.4	77.6	0.35	1	1905.5	75.3	0.26
6,950	Howe 34	14 36 42	+12 25	8.7, 9.2	1909.4	13.8	2.52	6	1879.4	13.5	2.48
* 6,954	Σ 1864	14 37 12	+16 44	4.9, 6.0	1911.4	103.0	6.04	4	1830.3	99.2	5.83
* 6,955	Σ 1865	14 37 34	+14 3	3.5, 3.9	1893.49 96.38 97.41 98.44 1900.47 01.39 02.40 03.37 04.70 06.94 08.98 11.24 14.19	284.7 273.2 258.0 252.4 145.3 151.1 150.4 146.1 145.3 145.9 141.8 137.6 138.7	0.44 0.21 elongated 0.1 0.27 0.34 0.33 0.34 0.36 0.44 0.43 0.56 0.62	3 1 1 2 8 5 6 6 4 7 12 11 13	1830.47	309.2	1.19
* 6,958	Σ 1867	14 37 36	+31 36	7.7, 8.2	1897.2 1902.5 13.9	14.4 13.8 12.8	1.20 1.22 1.24	14 14 2	1831.8	21.8	1.63

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 7,034	Σ 1888	h m s 14 47 55	° ' " +19 24	4.7, 6.6	1896.66 98.89 1901.18 02.72 04.92 08.44 10.61 12.99 14.72 † 17.44 19.42	° 219.3 211.3 199.7 190.7 177.2 154.1 139.2 123.0 103.7 86.1 75.7	" 2.76 2.82 2.84 2.54 2.55 2.35 2.15 2.16 2.11 1.80 2.43	4 4 4 7 4 4 5 5 3 2 4	1836.47	° 328.2	" 7.09
7,038	Ho. 389	14 48 42	+20 35	7.0, 9.3	1905.9	95.9	1.53	6	1892.1	100.8	1.12
* 7,044	ΟΣ 287	14 48 45	+45 13	7.5, 7.6	1897.7 1901.6 06.2 11.7 14.5 19.6	140.1 140.4 141.1 143.5 145.6 148.0	0.78 0.75 0.80 0.83 0.91 0.89	9 12 8 7 5 1	1845.5	97.3	0.58
	‡ A. 2071	14 48 56	+18 16	8.6, 9.2	1910.5	271.4	0.82	2	1909.4	261.6	0.77
* 7,040	β 31	14 49 3	+19 1	8.5, 10.2	1893.5 98.1 1903.1 12.1	194.5 196.0 195.3 198.0	1.85 1.41 1.51 1.56	4 8 9 4	1874.9	181.6	1.11
	AC			12.5	1897.1 1902.5 10.4	166.8 163.3 159.5	9.52 9.13 9.14	3 1 1	1878.3	161.4	9.04
7,047	β 942	14 49 47	- 0 10	9.2, 9.2	1897.5	200.1	0.94	1	1879.4	189.9	1.24
* 7,049	ΟΣ 288	14 49 53	+16 0	6.4, 7.1	1896.3 1902.0 06.6 12.2 19.4	190.4 190.9 188.3 188.2 184.7	1.53 1.61 1.72 1.54 1.77	7 14 10 14 2	1845.4	228.0	0.68
7,059	Σ 1891	14 51 27	+34 22	8.0, 9.7	1906.9	238.5	3.76	2	1832.2	233.9	3.58
7,065	ΟΣ 289	14 52 48	+32 35	6.3, 9.8	1908.5	113.8	4.49	2	1846.3	120.3	4.56
	§ A. 2072	14 55 30	+17 50	9.6, 9.6	1910.4	300.4	0.74	1	1909.4	304.3	0.78
7,096	β 348	14 57 58	+ 0 8	5.1, 7.4	1903.0 08.6	115.3 110.7	0.43 0.50	2 1	1875.8	114.6	0.47
7,114	Hu. 745	15 1 5	+20 8	7.5, 9.0	1911.4	23.1	0.45	3	1902.5	23.2	0.54
* 7,120	Σ 1909	15 1 22	+47 56	5.2, 6.1	1903.1 06.8 12.0	242.9 244.8 246.2	4.37 4.50 4.11	3 4 3	1832.2	234.0	2.86
7,122	Σ 1908	15 1 54	+34 45	8.2, 9.2	1898.3 1902.1 11.7	142.4 143.8 144.7	1.28 1.48 1.39	7 9 5	1832.5	137.2	1.46
* 7,119	Σ 1907	15 1 57	+11 55	8.5, 8.7	1910.4	4.1	1.12	8	1830.3	11.8	1.13
7,126	β 1086	15 2 57	+48 26	5.5, 13.2	1903.4	251.2	6.25	1	1889.2	256.6	6.03
7,127	Σ 1910	15 3 57	+ 9 30	7.0, 7.0	1912.6	210.2	4.27	5	1832.1	209.2	3.80

† Measures by R. Jonckheere (*A. J.*, vol. xxxi., No. 735).

‡ B.D. + 18° 29' 49".

§ B.D. + 18° 29' 65".

β.G.C.	Name.	1925°.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,128	Σ 1911	h m s	° ′			°	"			°	"
13,296	A. 1114	15 4 7	+58 58	9.1, 9.2	1914.6	294.1	0.73	1	1905.6	284.4	1.00
7,132	Σ 3090	15 4 52	- 0 42	8.3, 8.7	1905.5	279.9	1.56	1	1830.0	275.5	1.79
7,142	Hu. 143	15 5 20	+55 32	9.1, 9.4	1914.6	129.3	0.68	1	1900.6	127.1	0.74
7,138	Σ 1912	15 5 20	+ 5 29	8.5, 9.3	1910.9	154.8	6.76	2	1829.7	157.5	6.79
13,298	A. 690	15 6 47	+28 25	9.0, 9.5	1912.1	356.0	0.92	7	1904.5	1.6	0.82
7,147	Hu. 144	15 7 13	+20 37	8.8, 11.0	1903.5	241.8	0.71	1	1900.6	242.4	0.66
13,299	A. 1116	15 7 59	+10 24	8.1, 8.1	1911.4 14.9	24.4 27.2	0.43 0.40	6 4	1905.5	20.6	0.42
7,160	Σ 1917	15 9 3	+15 39	9.0, 9.3	1909.4	236.2	2.41	4	1829.7	239.3	2.22
7,171	Σ 1923	15 10 16	+14 43	8.5, 9.2	1910.3	12.9	4.75	5	1830.0	12.5	4.80
7,170	H. 1270	15 10.21	+ 7 5	9 , 10	1906.4	161.1	14.48	2	1828+	155±	12±
7,177	Ho. 60	15 10 37	+35 8	7.5, 7.6	1900.4 05.5 11.9	37.6 37.5 28.5	0.27 0.38 0.37	8 5 5	1885.0	33.3	0.38
* 7,185	Σ 3091	15 12 5	- 4 38	7.7, 7.7	1906.5 08.4 13.4 14.4 15.4	25.5 27.5 23.9 40.0 35.4	0.25 0.33 0.19 0.16 0.11	1 1 1 1 1	1832.4	227.3	0.5±
* 7,191	Σ 1926	15 12 6	+38 34	6.1, 8.4	1898.9 1910.3 14.5	251.9 254.0 257.0	0.88 0.90 0.91	2 6 3	1830.6	260.6	1.59
7,192	OΣ 295	15 12 10	+37 7	7.4, 9.0	1912.3	131.5	0.90	6	1846.4	128.4	0.74
7,196	Ho. 547	15 12 58	+17 4	7.9, 12	1907.0	297.0	5.62	5	1895.1	303.1	5.00
* 7,212	Σ 1934	15 14 45	+44 4	8.5, 8.5	1908.2	25.7	7.11	4	1830.9	45.1	5.30
7,207	H. 4758=Ho. 548	15 15 1	- 6 56	10, 12	1906.3	78.7	6.11	1	1835.6	77.5	4±
* 7,214	Σ 1932	15 15 7	+27 6	5.6, 6.1	1893.5 97.1 99.3 1900.9 03.1 05.2 11.1 12.9 14.7 19.5	317.3 324.4 327.5 331.5 334.9 337.6 355.4 357.7 1.9 14.6	0.92 0.78 0.77 0.68 0.69 0.58 0.63 0.55 0.61 0.52	2 7 8 9 7 5 8 13 8 1	1830.3	273.8	1.62
7,217	Ho. 61	15 15 11	+35 23	8.2, 13.0	1910.5	258.1	1.96	1	1886.6	253.3	1.96
7,222	β 32	15 17 12	+ 0 59	4.7, 9.3	1908.6	9.6	1.80	1	1875.4	13.2	2.28
7,231	Hu. 146	15 17 39	+21 20	8.7, 9.0	1903.1	173.3	0.38	5	1900.6	171.8	0.25
7,235	Ho. 62	15 17 51	+35 15	8.7, 8.7	1900.6 07.8	286.4 283.5	1.17 1.14	8 5	1886.6	283.2	1.02

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,236	Ho. 264	h m s	° ′	8 , 12	1904.5	°	"				
		15 18 27	+16 46			323.3	1.16	2	1887.6	318.1	0.91
* 7,251	Σ 1937	15 20 6	+20 33	5.2, 5.7	1893.50	244.8	0.85	2	1826.77	35.3	1.07
					96.35	310.8	0.45	3			
					97.34	329.1	0.40	4			
					98.49	342.8	0.46	3			
					99.36	352.7	0.61	4			
					1900.43	3.2	0.65	5			
					01.36	7.5	0.73	4			
					02.42	11.2	0.75	4			
					03.40	14.9	0.89	3			
					04.47	16.7	0.93	3			
					08.48	29.0	1.13	2			
					09.55	34.1	0.92	1			
					10.52	37.5	1.08	3			
					11.54	42.0	1.02	4			
					12.54	40.3	1.08	4			
					13.45	49.5	1.02	5			
					14.45	49.7	0.93	6			
					19.62	85.6	0.68	1			
7,255	Hu. 148	15 20 31	+55 32	9.0, 9.8	1914.6	202.8	1.67	1	1899.7	200.7	1.48
7,260	Hu. 649	15 21 33	+49 47	8.2, 13.0	1905.4	50.2	4.44	2	1904.3	49.5	4.51
* 7,259	Σ 1938	15 21 42	+37 36	6.7, 7.3	1893.50	82.9	1.26	1	1826.77	327.0	1.38
					98.49	77.4	0.93	7			
					1901.63	72.7	0.98	10			
					04.54	66.8	1.10	7			
					11.10	59.4	1.15	4			
					14.23	54.2	1.25	5			
7,262	Σ 1941	15 22 32	+26 53	8.7, 8.7	1910.3	224.1	1.41	13	1832.6	232.7	1.61
7,263	Σ 1940	15 22 43	+18 26	8.2, 8.7	1904.6	324.9	1.13	2	1830.4	325.5	1.48
	† A. 2073	15 23 40	+18 19	9.5, 9.5	1910.4	87.3	0.69	1	1909.6	96.0	0.36
7,275	A. 82	15 23 50	+24 10	8.5, 9.3	1903.2	322.2	0.81	8	1900.6	322.5	0.80
					11.9	317.6	0.90	6			
* 7,276	ΟΣ 296	15 23 50	+44 16	7.0, 8.6	1897.3	307.5	1.51	5	1845.5	327.9	1.52
					1903.8	305.3	1.56	8			
					11.9	302.4	1.51	4			
* 7,273	Σ 1944	15 24 0	+ 6 21	7.5, 8.1	1894.5	329.5	1.08	1	1832.4	341.6	1.34
					1907.2	324.7	1.08	4			
					11.4	324.4	0.93	3			
7,279	Σ 1946	15 24 23	+39 45	8.5, 10.5	1908.6	343.3	7.47	1	1830.3	345.9	7.40
7,281	Ku. 50	15 24 24	+46 25	9.5, 9.9	1904.7	336.7	3.00	3	1901.4	332.3	3.16
					10.1	334.8	3.19	4			
7,282	Hu. 150	15 25 25	+20 53	9.0, 9.4	1910.0	25.4	4.41	7	1900.6	26.6	4.46
7,295	Σ 1950	15 26 45	+25 45	6.7, 8.2	1908.9	92.6	3.30	6	1830.3	93.2	3.21
					11.9	92.7	3.13	8			
7,298	Hu. 651	15 26 47	+50 42	8.2, 12.8	1905.4	343.0	1.03	2	1904.3	346.1	1.10
7,297	Σ 1951 rej.=Ho.394	15 27 11	+27 55	7.2, 11.0	1906.4	305.6	12.74	3	1892.1	310.4	11.83
13,311	Hu. 1163	15 27 57	+38 26	8.2, 8.5	1911.4	268.7	0.45	6	1905.4	266.4	0.41

† B.D. + 18^o.3022.

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
13,312	A. 1122	h m s	° ' "	8.5, 10.2	1913.4	24.1	0.44	1	1905.5	22.5	0.51
7,303	Σ 1952	15 28 18	+ 9 55	7.8, 9.0	1910.9	221.7	15.93	2	1829.7	221.9	15.92
7,307	Σ 1953	15 29 10	+ 5 45	8.7, 9.8	1905.4	254.9	7.00	1	1831.0	255.1	6.54
7,308	Hu. 577	15 29 28	+19 59	8.0, 8.0	1903.9 11.7 14.7	22.2 30.3 32.3	0.37 0.34 0.29	5 10 8	1902.5	23.6	0.30
7,317	Σ 1956	15 30 36	+42 3	8.0, 9.5	1905.3	40.0	1.97	2	1831.5	41.4	2.72
7,313	Σ 1955	15 30 39	+26 57	8.7, 9.3	1905.3	236.9	7.89	2	1832.4	240.1	7.41
* 7,318	Σ 1954	15 31 14	+10 47	3.0, 4.0	1897.4 1903.5 07.2 12.9 19.4	187.4 186.3 185.2 186.1 185.2	3.79 3.66 3.45 3.53 4.06	3 10 5 7 1	1833.1	197.3	2.66
7,322	Σ 1959	15 31 41	+35 0	8.7, 10.2	1905.3	241.5	2.17	2	1831.6	241.1	1.71
* 7,323	Σ 1957	15 32 20	+13 10	7.9, 9.6	1897.9 1902.1 10.6	155.0 154.0 151.5	1.17 1.16 1.02	10 8 10	1831.1	163.1	1.41
7,328	Ho. 63	15 32 36	+28 37	9.0, 9.2	1906.4	306.5	1.34	3	1885.6	301.1	1.04
* 7,332	O Σ 298	15 33 24	+40 3	7.0, 7.3	1897.47 1901.82 07.05 13.22	176.2 182.7 189.8 197.9	0.97 1.04 1.22 1.28	9 14 10 3	1846.49	181.6	1.20
13,318	A. 1124	15 34 14	+55 47	8.6, 9.3	1910.7	129.9	1.07	1	1905.7	133.9	1.05
7,341	Σ 1963	15 34 46	+30 21	7.3, 7.7	1905.3	292.8	5.73	2	1830.0	291.2	4.23
7,345	Hu. 652	15 35 11	+49 4	8.5, 8.8	1905.4	175.7	0.79	1	1904.3	172.0	0.77
7,344	Σ 1964 AB, C	15 35 24	+36 29	6.8, 7.3	1907.0	83.0	15.41	2	1830.9	86.1	15.36
	CD			8.8	1909.3	11.5	1.55	4	1830.9	8.1	1.34
13,319	Hu. 1167= Σ 1964 AB			7.4, 12.5	1911.6	84.9	1.00	2	1905.4	89.2	0.85
7,348	A.G. 197	15 36 29	+21 31	9.0, 9.1	1910.9	126.1	3.04	8	1902.5	126.6	3.35
* 7,352	Σ 1965	15 36 34	+36 53	4.1, 5.0	1910.3	303.8	6.20	5	1829.7	300.8	6.00
	† A. 2076	15 37 5	+18 55	8.0, 8.0	1910.4	143.6	0.22	1	1909.4	146.1	0.24
7,360	Hu. 580	15 38 13	+19 54	5.0, 5.0	1905.61 09.98 13.87	77.5 81.0 68.9	0.16 0.15 0.20	12 11 16	1902.54	71.8	0.21
* 7,368	Σ 1967	15 39 36	+26 32	4.0, 7.0	1897.5 1900.8 06.2 10.9 14.3 19.6	118.9 117.2 117.6 114.2 115.3 113.2	0.51 0.46 0.60 0.62 0.64 0.64	10 17 11 17 8 1	1826.8	111.0	0.72

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 7,367	β 619	h m s 15 39 40	$^{\circ}$ ' +13 54	6.5, 7.0	1901.6 03.9 10.3	$^{\circ}$ 5.8 4.7 5.2	" 0.46 0.49 0.47	12 9 6	1878.4	$^{\circ}$ 359.7	" 0.58
* 7,375	Σ 1969	15 39 48	+60 13	8.0, 8.7	1905.4	49.7	0.51	2	1831.9	43.4	1.46
* 7,381	Pritchett=Ku. 51	15 41 53	+35 50	9.4, 9.5	1908.6	228.2	5.32	1	1881.5	45.1	3.94
7,393	Hu. 657	15 43 33	+50 54	8.5, 8.8	1905.4	130.5	0.57	1	1904.3	122.3	0.54
7,392	O Σ 301	15 43 40	+42 41	7.0, 10.6	1909.7	29.6	4.04	2	1849.1	30.4	3.93
7,398	Σ 3126	15 46 10	- 2 58	9.2, 9.2	1899.6 1914.4	104.1 106.1	2.34 2.55	1 1	1833.4	102.3	2.44
7,401	Σ 1977	15 46 24	+25 41	7.7, 9.7	1905.3	356.5	13.68	2	1831.6	357.5	14.05
7,400	Σ 3097	15 46 52	- 8 48	8.8, 9.2	1905.5	183.9	4.19	1	1831.4	181.0	3.97
7,408	Σ 1979	15 47 20	+22 41	8.5, 9.1	1905.3	246.0	9.61	2	1832.1	247.4	9.42
* 7,414	β 621	15 47 23	+44 44	7.5, 8.0	1901.8 11.5	56.3 50.0	0.47 0.49	8 6	1878.5	75.1	0.5 \pm
7,421	β 810	15 48 27	+42 42	8.5, 11.2	1902.0 11.2	90.2 89.0	1.09 1.06	2 2	1881.3	93.2	1.09
7,424	Hu. 747	15 49 34	+20 14	9.0, 13.0	1908.5	117.2	2.39	3	1904.3	114.2	2.43
7,436	Hu. 658	15 51 27	+51 40	8.3, 13.0	1905.4	341.9	2.63	1	1904.3	340.0	2.38
7,439	Ho. 399	15 52 24	+29 45	7.5, 10.0	1907.5	119.1	3.00	6	1891.5	117.5	2.31
* 7,440	Σ 1988	15 53 14	+12 42	7.5, 8.2	1910.9	261.0	2.34	11	1830.1	266.3	2.91
7,459	Σ 1991	15 54 51	+41 52	8.2, 9.5	1905.3	198.0	3.56	2	1831.6	202.1	3.12
7,454	Σ 3101	15 55 4	- 2 52	8.2, 8.5	1905.5	68.7	2.37	1	1831.9	60.3	2.04
7,471	Σ 1992	15 56 43	+11 53	8.7, 9.2	1910.7	325.5	5.88	3	1831.3	329.9	5.71
7,473	Ho. 400	15 56 57	+15 53	8.0, 13	1906.4	131.9	10.84	2	1893.5	132.9	9.82
* 7,477	O Σ 303	15 57 24	+13 29	7.4, 7.9	1897.8 1902.4 07.8 12.9	140.9 143.2 144.1 148.6	0.76 0.81 0.84 0.83	16 18 10 12	1846.8	111.4	0.60
7,482	O Σ 304	15 58 16	+39 23	6.5, 10.7	1904.6	177.3	10.57	1	1847.4	173.8	10.73
7,483	A.G. 200	15 58 31	+39 48	9.3, 9.5	1911.1	212.6	3.43	3	1904.3	210.9	3.21
7,484	Σ 2001	15 58 44	+42 2	8.7, 10.5	1904.6	171.5	11.45	1	1829.7	169.6	11.57
* 7,490	Σ 2006	15 58 52	+59 8	7.5, 9.2	1904.6	192.2	1.76	1	1831.0	204.5	1.61
	AC			7.7	1904.6	220.1	45.13	1	1830.6	223.7	43.54
7,486	Σ 2000	15 59 33	+14 12	8.2, 9.0	1909.0	228.0	2.47	6	1830.1	230.1	2.52
7,489	Σ 2003	16 0 6	+11 38	7.0, 11.0	1905.4	171.3	14.40	2	1831.3	171.1	13.96
7,491	Σ 2004	16 0 9	+29 3	8.7, 9.7	1900.9	278.4	1.59	4	1830.9	278.4	1.76

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 7,487	Σ 1998	h m s 16 0 15	° ' " -11 11	4.9, 5.2	1907.56 08.40 09.51 10.50 11.41 12.46 15.41	101.2 119.1 139.5 143.6 155.0 163.8 167.2	0.28 0.27 0.35 0.47 0.56 0.71 0.78	2 1 2 2 2 3 1	1825.47	356.0	1.15
* 7,495	β 948	16 1 44	- 6 6	6.8, 9.5	1905.5	143.6	1.43	1	1879.6	150.5	1.46
	AC= Σ 2005 rej.			10.4	1905.5	233.2	29.00	1	1879.4	233.7	28.54
7,498	β 811	16 2 1	+22 22	8.1, 12.1	1908.9	219.9	3.57	5	1881.3	221.6	3.49
* 7,500	Σ 2007	16 2 33	+13 31	6.5, 8.0	1908.5	325.9	34.82	1	1830.1	328.2	31.97
7,504	Σ 2008	16 3 40	- 2 28	8.5, 9.2	1905.4	59.4	9.06	1	1831.9	58.4	8.77
* 7,505	β 812	16 3 44	+17 5	8.2, 8.3	1909.0 12.1	121.2 120.1	0.73 0.69	11 8	1881.3	127.4	0.87
* 7,506	β 949	16 4 22	- 9 55	7.6, 7.7	1912.5 15.4	204.9 193.9	0.14 0.24	3 1	1880.3	197.8	0.62
7,516	Σ 2011	16 4 36	+29 11	7.2, 9.8	1901.6	68.8	2.31	5	1829.6	64.5	2.45
* 7,514	Σ 2010	16 4 42	+17 14	5.0, 6.0	1914.7	11.7	28.83	2	1832.6	9.6	31.21
7,527	β 355	16 5 38	+45 34	7.8, 8.0	1900.5	280.4	0.39	8	1876.3	279.3	0.34
7,526	Ho. 550	16 5 42	+25 7	8.5, 12.7	1906.4	297.9	15.47	1	1897.5	301.4	14.70
7,529	Σ 2014	16 6 2	+40 14	7.8, 10.3	1904.6	92.4	8.35	1	1830.4	91.0	8.19
7,534	Σ 2015	16 6 35	+45 32	7.7, 8.8	1898.7 1905.3	159.8 159.6	2.80 2.98	5 3	1830.0	159.3	2.68
	AC			13.0	1900.8	98.2	12.60	3	1892.3	97.3	12.8
7,533	β 120	16 7 38	-19 17	4.2, 6.7	1912.1	9.2	0.87	3	1876.4	0.0	0.73
	CD			7.0, 8.0	1912.1	48.4	2.08	3	1846.6	39.0	1.11
* 7,540	Σ 2016	16 8 34	+12 6	8.3, 9.7	1904.6	146.4	7.28	1	1830.8	148.9	6.91
7,549	Σ 2025	16 8 55	+47 45	7.6, 10.9	1905.4	165.2	2.69	1	1830.6	164.3	2.77
7,546	O Σ 306	16 9 1	+34 35	7.2, 8.7	1911.6	35.2	0.34	3	1846.6	55.9	0.37
7,547	Ho. 551	16 9 18	+26 37	7.5, 12	1906.8	82.9	6.92	8	1897.5	81.0	6.37
* 7,552	Σ 2022	16 9 39	+26 52	6.2, 9.8	1899.4 1907.1 11.9	133.9 140.0 139.5	2.34 2.57 2.45	2 7 5	1830.6	129.5	2.77
* 7,551	Σ 2021	16 9 47	+13 44	6.7, 6.9	1902.3 07.2 13.0	333.9 335.9 337.2	3.92 3.92 3.89	11 5 14	1829.5	315.5	3.20
7,555	Σ 2030	16 10 8	+40 58	7.5, 10.8	1904.6	240.3	6.03	1	1831.5	238.4	5.48
7,556	Σ 2029	16 10 46	+28 55	7.5, 9.3	1904.6	186.2	6.31	1	1830.9	187.5	6.29
* 7,554	Σ 2023	16 10 49	+ 5 43	8.0, 9.0	1912.2	225.5	1.74	3	1832.4	235.9	1.55

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,558	Σ 2027	h m s	° ' "			°	"			°	"
		16 11 33	+ 4 27	8.2, 8.2	1904.6	79.8	1.68	1	1831.4	75.2	1.98
* 7,563	Σ 2032	16 11 53	+34 3	5.0, 6.1	1899.5 1912.3 19.6	212.6 217.5 216.7	4.46 4.95 5.04	10 13 2	1827.0	89.3	1.31
	AD			10.5	1905.4 13.2	85.8 85.0	62.47 65.29	1 5	1836.7	88.8	43.75
7,564	Hu. 480	16 12 15	+19 55	9.0, 10.2	1910.1	250.9	1.35	3	1902.4	250.1	1.59
* 7,561	Σ 2026	16 12 16	+ 7 34	8.6, 9.1	1897.90 1904.97 07.50 19.46	263.3 201.1 188.7 104.3	0.79 0.68 0.50 0.29	2 2 2 1	1830.94	345.9	2.54
7,568	A. 348	16 13 7	+29 47	8.2, 10.5	1908.5	122.3	1.15	2	1902.7	120.4	0.92
7,576	Σ 2035	16 15 1	+26 2	8.7, 10.9	1904.6	35.3	2.46	1	1831.0	34.3	2.68
7,578	Σ 2037	16 15 23	+17 35	9.0, 9.0	1902.4	239.8	1.40	2	1830.8	238.2	1.56
13,345	Hu. 661	16 15 40	+49 25	9.0, 9.2	1911.2	52.0	0.68	2	1904.4	50.7	0.80
13,344	Hu. 1172	16 15 53	+32 5	9.1, 10.0	1911.0	326.4	1.63	4	1905.4	328.5	1.48
* 7,587	OΣ 309	16 16 45	+41 50	7.5, 7.7	1909.3 19.6	249.0 246.4	0.41 0.41	15 1	1846.9	236.4	0.52
7,591	Hu. 481	16 18 2	+23 9	7.3, 9.2	1905.4 12.9	227.5 213.1	0.46 0.48	9 12	1902.5	227.5	0.51
7,598	Hu. 482	16 18 52	+22 28	9.0, 13.8	1903.4	148.4	1.58	1	1902.5	149.9	1.31
7,605	Σ 2040	16 19 37	+14 0	8.0, 10.0	1905.4	311.6	7.14	2	1831.9	313.8	6.56
7,616	Ku. 53	16 20 14	+38 26	9.7, 10.1	1910.7	230.5	5.52	1	1901.5	49.4	5.47
* 7,619	β 951	16 20 41	+33 31	8.2, 8.7	1900.9 12.7	52.7 47.1	0.89 0.89	11 9	1879.3	57.3	0.98
7,628	Ho. 405	16 21 54	+36 42	9.0, 12.0	1908.6	333.6	3.68	1	1892.5	342.2	3.42
	AC			12.0	1908.6	326.9	13.87	1	1892.5	328.4	13.76
7,627	Σ 2043	16 22 4	+17 28	7.7, 11.0	1904.6	88.8	10.50	1	1830.8	86.7	9.85
7,630	OΣ 310	16 22 46	+38 4	7.6, 10.2	1910.5	223.2	2.97	4	1854.3	221.3	2.99
* 7,632	Σ 2054	16 22 47	+61 51	5.7, 6.9	1900.6	357.2	1.07	6	1832.2	7.4	0.90
* 7,634	OΣ 312	16 22 58	+61 40	2.1, 8.1	1900.8	141.1	5.14	3	1843.7	144.0	4.66
7,635	A. 226	16 24 15	+27 2	8.9, 13.4	1910.8	112.5	0.73	1	1901.7	110.2	0.98
* 7,636	HΣ=Hu. 483	16 24 31	+21 3	8.2, 13.0	1906.2	295.4	1.67	3	1887.6	298.8	1.52
	AC=OΣ 311			7.5, 10.3	1905.5	205.3	6.27	7	1845.9	183.8	13.56
7,639	β 814	16 24 41	+40 3	8.4, 8.7	1900.5	321.0	0.32	6	1881.4	322.6	0.36
* 7,640	β 815	16 24 43	+43 4	8.1, 10.4	1911.3	335.2	10.60	2	1881.3	348.4	6.42
* 7,637	Σ 2049	16 24 49	+26 8	6.5, 7.5	1910.9	207.3	1.13	11	1829.6	215.2	1.07

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,638	β 813	h m s 16 24 52	° ' " +26 41	8.4, 8.4	1902.1 12.6	° 166.9 167.3	" 1.02 0.95	7 6	1881.3	° 165.4	" 0.96
* 7,642	Σ 2052	16 25 37	+18 33	7.5, 7.5	1897.91 1903.39 13.08 † 17.44 19.60	94.7 92.0 79.8 47.0 30.1	1.89 1.56 0.78 0.27 0.21	10 19 11 2 2	1829.52	109.7	2.98
7,650	Hu. 663	16 26 7	+51 45	7.0, 11.8	1910.8	235.6	2.65	1	1903.3	235.7	2.98
7,653	Hu. 748	16 26 57	+51 34	6.2, 12.8	1910.8	81.8	11.48	1	1904.3	83.4	6.04
* 7,649	Σ 2055	16 27 8	+ 2 8	4.0, 6.1	1897.22 1903.06 07.14 13.13 † 17.16 19.45	48.6 58.2 62.4 71.9 76.0 85.5	1.31 1.27 1.24 1.06 0.92 0.90	7 9 11 9 3 2	1825.51	331.8	0.84
13,348	Hu. 1173	16 27 15	+34 3	8.4, 8.7	1911.8	66.3	0.22	10	1905.4	69.2	0.24
* 7,651	Σ 3105	16 27 46	- 6 52	7.7, 7.7	1902.8 11.2	30.8 29.2	0.48 0.35	10 8	1835.6	57.5	0.62
7,656	Ho. 64	16 27 50	+27 53	9.7, 9.7	1906.4	107.4	4.52	3	1884.0	109.7	4.45
7,657	Ho. 406	16 27 50	+26 11	8.0, 12.8	1907.1	349.1	6.49	5	1893.2	349.7	5.93
	AC			8.5	1906.4	21.7	26.62	2	1892.5	21.5	26.28
7,661	Σ 2057	16 28 17	+19 26	9.0, 9.2	1911.7	265.9	4.98	5	1830.8	264.6	4.94
7,663	Σ 2058	16 28 25	+19 27	9.0, 9.5	1912.6	345.9	1.75	11	1831.0	345.8	1.87
7,668	β 816	16 28 41	+33 39	6.3, 11.8	1911.1	223.3	5.00	3	1881.3	224.1	4.97
7,669	β 817	16 29 24	+23 23	8.2, 8.2	1900.9	147.5	1.05	5	1881.3	147.0	1.14
7,670	Ho. 552	16 30 0	+23 16	8, 12	1906.8	297.8	17.63	3	1896.5	301.6	17.24
* 7,673	OΣ 313	16 30 1	+40 16	7.2, 7.8	1912.6 † 17.7	145.5 145.7	0.94 0.70	14 2	1847.5	162.1	0.80
7,674	Σ 2061	16 30 17	+31 4	7.1, 9.9	1910.4	23.8	2.58	9	1829.7	24.7	2.60
7,680	Σ 2067	16 30 39	+39 4	8.5, 10.0	1904.6	300.1	2.59	1	1829.5	300.1	2.14
7,676	Σ 2062	16 30 52	+ 8 50	8.3, 10.0	1904.6	116.8	2.50	1	1832.1	112.9	2.30
7,677	β 818	16 31 19	+30 39	6.3, 13.5	1900.6	34.7	3.87	1	1881.5	33.5	3.29
7,691	β 952	16 32 45	+37 3	8.0, 10.3	1911.1	147.1	3.54	5	1880.5	146.1	3.85
* 7,703	Σ 2078	16 34 26	+53 4	5.0, 6.0	1912.8	112.0	3.50	5	1831.9	116.5	3.74
7,705	OΣ 314	16 35 36	+20 36	7.2, 10.1	1911.5	234.0	3.68	5	1851.2	233.1	3.66
7,706	Hu. 485	16 35 39	+22 54	8.8, 13.0	1910.5	276.6	4.39	2	1902.5	277.6	4.56
* 7,708	Σ 2080	16 36 0	+38 28	8.0, 11.8	1905.4 10.8	25.3 23.2	3.17 2.70	1 1	1830.4	29.3	5.61

† Measures by R. Jonekheere (*A. J.*, vol. xxxi., No. 735).

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,707	Hu. 486	h m s	° ′	9.0, 10.0	1904.9	142.2	1.15	6	1902.5	141.5	1.23
7,709	Σ 2079	16 36 25	+23 8	7.1, 7.9	1904.5	90.6	16.75	1	1831.3	90.9	16.81
7,714	Σ 2082	16 36 43	+49 4	4.0, 10.7	1910.8	91.0	24.99	1	1828.4	92.3	22.39
7,710	Σ 2076	16 36 49	- 0 1	8.7, 9.8	1904.6	325.7	9.16	1	1832.1	328.7	9.10
7,715	Ho. 553	16 37 44	+22 5	7.5, 12	1906.7	185.0	11.87	4	1897.5	182.2	11.80
7,716	A. 349	16 38 19	+30 17	9.2, 10.0	1909.4	108.3	0.64	3	1902.7	111.8	0.56
* 7,717	Σ 2084	16 38 31	+31 43	3.0, 6.5	1894.54	40.4	1.24	2	1826.63	23.4	0.91
					95.44	37.9	0.67	1			
					96.46	6.0	0.54	2			
					97.40	2.3	0.45	3			
					98.64	287.8	0.57	6			
					99.46	263.2	0.61	11			
					1900.66	236.1	0.75	9			
					01.58	224.8	0.91	22			
					02.56	216.0	1.01	10			
					03.49	199.7	0.96	3			
					04.52	190.3	1.27	4			
					05.52	187.1	1.40	2			
					06.52	176.1	1.10	6			
					07.52	167.7	1.15	9			
					08.67	159.3	1.16	14			
					09.62	151.6	1.12	2			
					10.71	144.6	1.26	3			
					11.57	138.9	1.16	8			
					12.56	126.4	1.25	6			
					13.62	122.2	1.26	2			
					14.48	111.3	1.37	4			
					15.55	108.5	1.26	2			
					† 17.60	100.5	1.36	2			
					19.60	88.3	1.59	1			
7,721	Hu. 487	16 38 54	+21 59	9.0, 9.0	1907.4	27.1	0.49	7	1902.5	26.0	0.50
					11.8	22.5	0.50	8			
7,725	Σ 2085	16 39 13	+21 43	7.3, 8.8	1904.6	308.0	6.33	2	1830.3	309.0	6.10
7,730	Σ 2087	16 39 26	+23 48	8.2, 8.2	1907.2	288.9	5.90	3	1830.7	291.8	5.74
7,734	Σ 2091	16 39 41	+41 19	7.5, 8.0	1900.3	305.4	1.01	14	1830.1	302.2	1.29
					06.8	303.6	0.98	9			
					12.1	307.1	1.03	6			
7,736	Σ 2089	16 40 15	+25 16	8.0, 11.5	1904.5	61.6	2.52	1	1830.6	61.0	2.30
* 7,739	Σ 2094	16 41 1	+23 38	7.3, 7.6	1906.9	77.0	1.39	7	1831.4	82.8	1.63
					11.7	78.4	1.38	10			
	AC			11.0	1907.4	312.8	24.93	5	1830.5	311.4	25.32
* 7,748	Δ 15	16 41 36	+43 36	8.0, 8.2	1898.75	326.8	0.44	5	1869.74	132.7	0.91
					1901.15	317.4	0.51	6			
					03.74	307.5	0.54	5			
					07.85	294.2	0.52	5			
					11.95	276.4	0.42	4			
					† 17.75	252.1	0.41	2			
					19.60	236.2	0.32	1			

† Measures by R. Jonckheere (*A.J.*, vol. xxxi, No. 735).

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 7,751	Σ 2097	h m s	° ′	8.5, 8.7	1911.1	82.9	2.02	7	1829.6	89.9	2.14
7,749	Σ 2095	16 42 5	+35 51	7.0, 9.0	1905.4	162.3	5.18	1	1830.6	163.9	4.96
7,756	Espin 76	16 42 7	+54 44	9.0, 9.5	1913.7	47.1	2.52	3	1901.	47.0	2.5
* 7,759	Σ 2101	16 43 5	+35 46	6.3, 9.0	1909.4	55.2	4.45	5	1829.6	60.2	4.31
13,354	Hu. 666	16 44 15	+23 8	8.7, 12.5	1904.6	200.2	0.62	1	1903.4	205.6	0.56
7,764	Weisse 31	16 44 30	+25 46	8.7, 8.7	1910.3	137.6	4.79	4	1879.4	138.1	4.90
	AC			11.0	1909.9	245.5	27.09	3	1879.4	242.8	25.42
	BC				1908.6	255.9	28.09	1			
7,763	β 43	16 44 34	+ 2 52	8.7, 8.8	1907.5	244.9	0.83	3	1875.2	246.5	0.89
7,765	Ku. 55	16 45 4	+14 57	9.5, 10.1	1909.9	46.6	2.45	3	1901.5	47.1	2.43
7,766	Σ 2102	16 45 27	+21 31	8.0, 10.5	1904.6	276.6	14.13	1	1831.0	276.7	14.00
7,769	Σ 2104	16 46 1	+36 3	6.2, 8.0	1905.4	17.4	5.80	2	1829.4	19.6	5.86
7,768	Σ 2103	16 46 8	+13 23	5.2, 10.0	1904.6	37.7	5.22	1	1830.5	36.6	5.67
* 7,779	β 627	16 47 2	+46 7	5.0, 10.5	1903.4 † 17.8	321.5 330.5	1.48 1.11	1 3	1878.4	309.4	1.83
* 7,778	Σ 2106	16 47 33	+ 9 32	6.7, 8.4	1898.3 1907.5 12.7	304.3 288.5 279.3	0.35 0.33 0.20	6 9 8	1827.3	337.5	1.01
* 7,777	OΣ 315	16 47 37	+ 1 20	6.2, 8.1	1901.0 07.2	158.6 154.3	0.70 0.65	6 5	1844.5	173.3	0.87
* 7,783	Σ 2107	16 48 52	+28 47	6.5, 8.0	1897.03 1901.52 05.00 08.90 12.99 † 16.75 19.60	291.6 329.3 359.8 6.7 18.5 20.5 31.6	0.46 0.30 0.37 0.46 0.52 0.57 0.59	8 11 6 8 16 3 2	1829.01	148.6	1.13
7,785	β 821	16 48 56	+31 58	8.4, 8.9	1901.3 10.5	311.7 312.3	1.34 1.24	7 6	1881.4	313.6	1.21
7,795	Σ 2109	16 50 33	+21 17	7.0, 10.2	1907.6	312.6	5.97	6	1831.5	314.8	5.95
7,799	A. 350	16 51 3	+29 13	9.0, 9.0	1911.7	140.6	0.39	11	1902.8	140.1	0.38
7,802	A.G. 207	16 51 31	+24 38	9.0, 11.5	1909.5	212.5	3.23	1	1902.5	210.9	2.06
7,798	Σ 3106	16 51 40	- 5 4	8.6, 8.6	1905.6	252.3	2.28	1	1831.9	246.5	2.35
7,809	Hu. 160	16 51 52	+10 21	8.9, 9.2	1902.5	194.0	0.62	1	1900.6	203.4	0.61
7,805	Σ 2110 rej.	16 51 56	+25 51	6.0, 11.9	1905.5	94.2	17.55	2	1879.0	93.2	18.06
7,806	Ho. 409	16 52 18	+23 28	8.1, 13	1907.0	18.9	8.37	4	1892.9	17.2	8.48
7,810	OΣ 318	16 53 14	+14 15	6.7, 9.3	1911.0	253.0	2.64	2	1847.7	250.9	2.75
13,356	A. 1142	16 53 57	+14 50	8.7, 12.7	1907.6	305.5	1.69	1	1905.6	311.8	1.67

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,814	O Σ 319	h m s	° ' "	7.5, 8.5	1910.8	63.3	0.85	11	1847.9	63.5	0.93
* 7,817	Σ 3107	16 55 6	+ 4 4	8.5, 8.5	1904.6	96.9	1.41	13	1831.9	112.3	1.60
7,819	O Σ 320	16 55 8	+25 26	7.5, 11.1	1910.1	246.9	5.71	2	1849.3	251.6	5.67
7,822	Σ 2112	16 55 24	+31 53	8.5, 9.5	1903.4	260.2	1.94	3	1830.9	260.6	1.90
7,825	O Σ 321	16 55 58	+14 25	7.7, 8.7	1911.0	7.7	0.68	2	1848.8	1.7	0.51
* 7,834	Σ 2118	16 56 3	+65 9	6.4, 6.9	1904.87 12.05	92.7 82.9	0.24 0.35	10 7	1832.30	246.4	0.85
* 7,831	Σ 2117	16 56 18	+51 55	8.4, 10.6	1904.6	102.7	1.57	1	1831.5	117.0	1.36
7,832	O Σ 322	16 57 9	+37 2	7.0, 9.8	1911.5	201.9	1.45	7	1847.3	202.5	1.69
7,836	Σ 2115	16 58 10	+15 3	5.7, 10.5	1905.5	237.7	19.04	1	1830.7	238.4	19.13
* 7,837	Σ 2114	16 58 23	+ 8 33	6.2, 7.4	1897.1 1904.2 12.6 19.5	157.5 161.4 166.1 171.2	1.13 1.23 1.13 1.68	11 16 11 1	1831.0	135.7	1.33
7,838	Σ 2113	16 58 27	+ 7 18	7.7, 9.5	1905.4	118.5	4.78	2	1832.8	119.0	4.68
7,843	Ho. 411	16 59 14	+23 49	8.3, 12.0	1905.8	264.7	1.86	3	1892.6	261.1	1.74
7,847	β 822	17 0 37	+19 47	6.9, 11.3	1908.5	224.1	1.41	3	1881.6	228.0	1.50
7,853	Σ 2121	17 0 54	+42 0	8.0, 10.0	1908.1	143.1	2.46	2	1831.2	140.3	2.81
7,852	Perry	17 1 23	+19 42	6.9, 10.2	1912.4	231.8	1.85	2	1881.5	232.5	1.78
7,857	Ho. 555	17 1 39	+33 20	9.3, 9.3	1907.4	183.7	1.22	6	1897.5	181.4	0.96
* 7,858	Σ 2120	17 1 47	+28 11	6.4, 9.2	1900.4 11.6	243.3 240.9	7.90 9.23	5 5	1829.6	11.4	3.83
7,856	β 357	17 1 59	+10 39	8.3, 10.0	1900.2 11.7	296.3 296.8	1.10 1.15	8 3	1876.6	294.7	1.15
* 7,863	β 823	17 2 48	+ 0 45	8.2, 9.2	1901.0	11.6	1.10	2	1881.4	353.9	1.04
7,871	A. 228	17 3 16	+26 37	9.0, 9.2	1910.5	185.9	0.63	8	1901.5	186.4	0.53
* 7,878	Σ 2130	17 3 46	+54 34	5.0, 5.1	1901.8 12.4	143.0 136.7	2.23 2.24	5 3	1828.5	208.1	3.34
	BC= β 1088			13.0	1903.4	189.0	12.37	1	1889.3	190.9	12.25
7,879	Hu. 167	17 5 2	+ 9 56	9.5, 9.8	1906.5	63.2	0.62	2	1900.6	59.5	0.58
*13,364	Hu. 1176	17 5 22	+36 2	6.0, 6.0					1905.3	111.7	0.12
7,886	Ho. 412	17 5 23	+36 2	6., 12	1907.8	140.8	19.79	5	1892.1	143.2	19.49
* 7,885	β 1118	17 6 4	-15 38	3.4, 3.9	1902.0 12.5	251.1 243.0	0.33 0.39	6 7	1889.4	274.7	0.35
7,895	Σ 2133	17 6 47	+49 51	9.0, 10.5	1904.6	199.6	3.39	1	1830.6	201.8	3.31
7,897	Hu. 170	17 8 41	+ 9 50	8.5, 10.8	1906.8	275.6	1.76	3	1900.6	273.7	1.71
7,896	Σ 2132	17 8 46	- 3 58	8.3, 9.0	1907.6	112.0	1.43	1	1831.5	108.0	1.52

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 7,898	Σ 2135	h m s	° ′	7.1, 8.4	1911.0	°	"	12	1829.5	°	"
		17 8 53	+21 18			179.5	7.29			166.1	6.70
{ 7,901	Σ 2136 AB, C	17 9 5	+39 21	8.0, 10.0	1910.3	112.8	15.76	1	1831.8	114.1	15.64
{ 13,367	Hu. 1178 AB			8.4, 8.7	1910.0	8.4	0.44	2	1905.3	9.5	0.27
	Hu. 1178 CD			9.0, 13.5	1910.3	77.8	1.09	1	1905.3	83.0	1.11
7,900	OΣ 325	17 9 22	+ 7 50	7.2, 9.1	1913.6	203.1	1.02	3	1857.3	202.9	1.67
7,909	Σ 2142	17 9 44	+49 49	6.2, 10.0	1905.5	113.6	5.28	1	1830.1	116.3	5.33
7,906	Σ 2137	17 10 31	+16 1	8.2, 9.2	1909.2	143.7	4.06	7	1830.8	145.4	4.02
7,908	Ho. 557	17 10 36	+16 26	8, 12	1906.2	319.8	4.91	8	1895.1	323.4	4.28
* 7,914	Σ 2140	17 11 13	+14 28	3.0, 6.1	1897.5	116.2	4.85	11	1829.6	118.5	4.65
					1904.4	112.3	4.78	16			
					12.5	113.5	4.70	12			
	AC			15.0	1905.5	333.8	23.91	1	1889.0	335.8	23.54
	AD			10.6	1902.6	39.1	85.26	1	1890.4	39.0	84.79
7,916	Hu. 488	17 11 15	+20 0	8.8, 10.0	1912.2	106.2	2.76	5	1902.4	108.3	3.06
* 7,922	Σ 3127	17 11 56	+24 55	3.0, 8.1	1903.0	192.8	14.47	9	1831.0	174.1	25.85
7,924	Hu. 489	17 12 17	+20 11	9.2, 10.5	1911.1	48.1	0.90	10	1902.4	47.1	0.97
* 7,936	OΣ 327	17 12 43	+56 12	7.6, 7.9	1900.5	314.6	0.24	5	1846.5	340.6	0.44
					13.4	327.2	0.34	5			
7,932	β 1200	17 13 8	+14 45	7.8, 12.2	1898.5	12.3	1.27	3	1890.4	12.6	1.42
* 7,935	H. C. Wilson 15	17 13 35	+26 39	8.3, 9.3	1903.6	44.3	0.45	11	1892.6	45.4	0.46
					10.4	42.0	0.48	8			
	AB, C=Σ 2145			8.0, 9.5	1904.9	180.8	13.59	6	1831.0	174.2	9.79
7,934	Hu. 172	17 13 50	+11 17	9.2, 11.7	1903.5	344.4	0.70	1	1900.6	347.5	0.69
7,944	OΣ 328	17 14 33	+33 10	4.8, 10.2	1909.4	60.4	4.46	5	1847.9	61.8	4.38
7,942	Σ 2147	17 14 39	+28 58	7.1, 11.0	1907.9	94.0	6.24	4	1833.6	93.1	6.60
7,945	β 629	17 14 41	+32 9	8.3, 9.0	1899.6	343.8	1.07	9	1878.4	345.8	0.99
					1908.6	337.2	1.06	5			
					19.6	340.0	1.00	1			
7,950	Ho. 67	17 14 58	+35 40	8.5, 12.5	1904.7	265.5	6.97	1	1884.6	261.5	6.30
7,952	β 45	17 15 10	+32 34	9.7, 10.3	1903.6	290.7	4.98	7	1875.1	289.9	4.83
* 7,955	β 628	17 15 35	+32 44	9.0, 9.5	1901.0	354.6	0.49	7	1878.4	5.6	0.54
					08.9	346.4	0.50	4			
* 7,965	Σ 2153	17 15 59	+49 23	8.6, 9.1	1910.8	265.0	1.85	1	1831.3	281.8	1.89
7,964	β 630	17 16 27	+32 25	8.7, 10.7	1899.6	223.8	1.46	8	1878.4	225.4	1.66
					1909.6	222.6	1.67	3			
7,971	Swift	17 16 39	+53 43	8.9, 9.0	1899.5	140.8	0.43	1	1889.4	132.0	0.57
					1910.8	141.8	0.60	1			

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
7,970	Σ 2154	h m s	° '	8.5, 9.5	1908.8	°	"	2	1830.4	°	"
		17 16 44	+44 12			248.6	1.91			249.1	1.81
7,978	Λ. 232	17 18 10	+25 47	8.7, 9.4	1909.9	102.2	0.55	5	1901.5	98.7	0.43
7,983	Ho. 414	17 19 7	+26 9	8.4, 8.8	1906.0	89.5	0.65	7	1891.8	85.3	0.45
7,986	Σ 2157	17 19 32	+16 32	8.3, 9.7	1910.4	206.1	3.25	5	1830.8	202.1	3.28
7,987	β 1284	17 19 40	+14 58	8.3, 11.3	1910.0	179.9	1.16	2	1899.4	180.1	1.23
7,991	Σ 2156	17 20 2	- 0 46	8.3, 9.0	1905.5	34.8	3.38	2	1830.8	32.3	3.27
7,995	Ho. 415	17 20 5	+25 49	8.0, 8.7	1906.1	330.5	1.23	8	1891.5	334.3	0.80
7,994	β 46	17 20 11	+13 28	7.7, 10.9	1894.5 1906.6 11.6	203.2 200.2 202.8	2.15 1.95 1.92	1 4 8	1875.0	203.0	2.15
	† Lewis	17 20 16	+36 51	9.0, 10.0	1905.5	255.7	1.54	1			
8,002	β 1249	17 20 29	+53 55	8.8, 9.0	1900.5	82.4	0.39	2	1891.4	80.1	0.44
7,996	Hu. 671	17 20 33	+21 59	8.4, 9.0	1904.6 12.5	266.0 266.6	0.43 0.54	3 2	1904.3	276.4	0.44
* 8,004	Σ 2163	17 21 2	+42 13	9.2, 9.2	1900.6 10.6	92.3 88.3	1.58 1.36	6 2	1830.0	103.5	1.51
7,998	Σ 2160	17 21 6	+15 40	5.5, 10.0	1903.6	61.6	3.97	1	1830.2	61.9	4.07
* 8,003	Σ 2161	17 21 6	+37 12	4.0, 5.1	1911.4	314.1	3.85	6	1830.4	307.2	3.60
8,005	Σ 2162	17 21 15	+36 31	8.5, 8.9	1905.5	279.2	1.37	1	1830.9	277.7	1.30
13,373	Hu. 1179	17 21 30	+38 39	7.0, 7.1	1908.6 11.9	276.5 274.1	0.24 0.24	12 8	1905.4	272.8	0.23
8,009	Σ 2164	17 21 41	+47 20	7.8, 9.3	1904.6	13.5	9.24	1	1829.5	16.5	8.82
* 8,008	β 1250	17 22 2	+30 49	10.3, 10.8	1898.4 1904.5	66.4 71.0	2.05 2.01	9 11	1877.3	57.6	1.93
13,376	Hu. 922	17 22 20	+34 48	9.0, 9.8	1910.8	0.3	0.52	1	1904.5	359.5	0.30
	‡ Bowyer	17 23 16	+35 43	9.5, 9.5	1905.4	212.8	4.59	1			
* 8,017	Σ 2165	17 23 20	+29 31	7.0, 8.5	1909.0	55.0	7.95	3	1832.2	45.7	6.71
8,023	Σ 2168	17 24 2	+35 49	7.5, 8.2	1909.4	198.1	2.21	5	1828.8	199.7	2.44
8,030	Ho. 416	17 24 54	+30 27	8.3, 10.0	1907.1	97.0	4.28	4	1892.6	95.2	4.15
8,025	Σ 2171	17 25 9	- 9 56	7.5, 7.6	1907.3	69.8	1.65	4	1830.5	75.7	1.62
* 8,028	Σ 2170	17 25 11	+10 32	8.5, 9.0	1909.3	69.2	3.72	7	1830.8	76.3	3.80
8,040	Σ 2177	17 25 42	+46 28	8.5, 10.0	1909.7	133.4	3.36	6	1831.5	133.7	3.15
8,036	Σ 2172	17 25 59	- 1 18	8.0, 10.8	1904.6	172.7	11.48	1	1830.8	173.1	11.55
8,044	Λ. 351	17 26 27	+29 27	9.5, 9.9	1910.8	66.0	0.56	1	1902.5	65.4	0.55
8,058	β 1201	17 26 32	+67 49	7.8, 7.8	1899.5	343.3	0.37	1	1890.5	338.2	0.43

† B.D. + 36° 2862 ?

‡ B.D. + 35° 2972 ?

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 8,038	Σ 2173	h m s 17 26 33	° ′ - 1 0	5.8, 6.1	1895.56 98.95 1901.59 06.73 09.58 11.53 12.66 15.20	° 336.8 335.0 328.3 316.6 279.4 211.3 185.3 159.4	" 1.14 1.09 0.95 0.55 0.27 0.19 0.25 0.61	4 6 10 6 2 3 3 3	1830.84	° 323.8	" 0.62
8,045	Σ 2174	17 26 37	+32 49	9.2, 10.5	1912.6	330.9	5.13	3	1829.7	331.6	5.64
8,047	Σ 2175	17 26 39	+32 45	8.0, 10.0	1909.3	8.7	13.29	3	1831.0	9.5	13.20
8,050	Ho. 417	17 26 44	+38 0	8.0, 8.0	1908.0	153.2	0.39	5	1892.6	150.6	0.37
8,049	Σ 2178	17 26 50	+35 0	7.0, 8.6	1904.7	129.6	10.59	1	1832.4	130.1	10.60
8,052	Σ 2176	17 27 34	+10 30	8.7, 9.7	1905.5	11.3	16.74	1	1829.5	9.0	16.86
8,056	Hu. 179	17 28 9	+11 15	8.8, 8.9	1908.9	51.7	2.11	7	1900.6	51.9	2.17
* 8,055	OΣ 331	17 28 17	+ 2 52	7.5, 9.0	1899.5 1911.6	336.9 341.2	0.95 0.84	8 4	1848.3	326.3	0.85
8,060	Σ 2182	17 29 21	+23 54	8.2, 9.2	1910.7	359.7	5.26	9	1833.2	0.9	5.28
8,065	Σ 2184	17 30 55	+13 13	6.3, 11.2	1904.6	73.8	21.68	1	1830.2	76.8	21.42
8,068	Σ 2185	17 31 8	+ 6 3	7.0, 10.0	1907.2	5.1	28.06	3	1830.5	5.5	27.50
	AC			7.7	1907.2	207.0	84.54	3	1864.5	190.4	97.09
8,075	Σ 2186	17 32 0	+ 1 2	7.5, 7.5	1905.5	79.6	2.77	1	1831.2	82.7	2.90
8,074	Σ 2187	17 32 0	+ 4 12	8.3, 9.3	1905.5	177.0	2.99	1	1830.9	177.6	3.13
8,078	Σ 2188	17 32 36	+ 6 40	8.5, 9.2	1905.5	203.8	5.43	2	1831.5	203.8	5.47
8,082	Σ 2190	17 32 49	+21 2	6.0, 9.5	1903.6	25.5	10.11	1	1829.7	33.2	10.17
8,086	β 1121	17 33 57	+12 34	8.5, 9.0	1898.3 1911.8	243.0 237.0	0.64 0.70	5 3	1889.1	240.1	0.71
* 8,099	β 962	17 34 15	+61 56	5.5, 10.1	1911.1	350.0	0.94	6	1880.0	151.8	1.37
8,091	A.G. 210	17 34 42	+23 0	9.0, 9.3	1911.4	174.6	4.23	7	1902.5	172.1	2.83
8,097	Ho. 420	17 35 7	+37 1	9.3, 9.6	1908.1	107.4	1.55	4	1893.5	103.4	1.03
8,094	Σ 2191	17 35 48	- 4 56	7.0, 8.0	1907.5	268.0	26.49	2	1831.5	268.2	26.48
* 8,100	β 631	17 36 6	- 0 37	7.0, 7.0	1901.3 12.5	62.3 57.2	0.35 0.31	12 13	1879.6	73.0	0.40
* 8,107	Σ 2192	17 37 10	+29 16	7.5, 9.9	1899.5	62.2	11.08	1	1833.5	88.4	10.41
8,126	Σ 2207	17 37 11	+67 9	8.0, 8.5	1899.5	129.5	0.74	1	1833.0	128.1	1.09
* 8,118	Σ 2199	17 37 14	+55 47	7.2, 7.8	1900.0 12.7	87.9 85.8	1.66 1.63	7 4	1830.9	116.4	1.67
8,109	A.G. 211	17 37 23	+20 19	9.0, 9.5	1910.9	128.2	2.66	5	1902.5	129.7	2.36
8,114	Σ 2194	17 38 1	+24 32	6.2, 8.5	1904.5	8.5	16.17	1	1831.1	9.4	16.13

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,113	Σ 2193	h m s	° ′			°	"			°	"
		17 38 15	+ 8 15	9.9, 9.9	1908.1	67.4	5.97	2	1830.9	69.1	5.71
8,119	Σ 2196	17 38 22	+21 13	9.2, 11.2	1908.1	259.9	3.52	4	1829.7	261.8	3.26
* 8,120	β 1251	17 38 36	+15 59	6.0, 11.5	1898.1 1902.6 13.6	72.6 66.5 52.2	1.23 1.24 1.02	4 8 1	1891.6	79.0	1.37
8,125	Σ 2197	17 38 49	+21 29	9.2, 9.7	1913.5	358.2	8.01	1	1829.7	358.6	8.09
* 8,127	Σ 2203	17 38 52	+41 41	7.5, 7.8	1897.6 1905.3 12.3 19.6	322.4 318.0 318.5 312.9	0.76 0.67 0.59 0.62	6 14 12 1	1830.1	333.5	0.72
8,123	A.G. 212	17 38 59	+ 5 21	9.5, 9.5	1911.5	24.6	2.76	2	1894.5	28.4	2.48
8,129	Σ 2198	17 39 37	+26 34	7.0, 11.0	1904.6	23.4	7.45	1	1829.7	24.8	7.65
* 8,145	Σ 2218	17 39 50	+63 43	6.5, 7.7	1899.5	346.5	1.83	2	1836.8	355.1	2.47
8,132	Σ 2200	17 40 11	+ 5 52	8.0, 8.8	1907.5	167.3	1.62	2	1830.9	168.2	1.66
8,139	Σ 2210	17 40 12	+49 1	8.5, 10.0	1904.7	122.2	3.25	1	1831.7	121.9	2.97
8,134	Σ 2201	17 40 39	+ 3 0	7.8, 10.5	1905.2	300.8	7.83	3	1831.5	302.2	7.20
8,138	Ho. 560	17 40 40	+33 59	8, 8	1908.5	94.9	0.54	12	1894.6	92.4	0.35
8,136	Σ 2202	17 40 48	+ 2 36	5.5, 5.8	1905.5	93.4	20.68	1	1827.4	94.1	20.54
8,147	Δ 16	17 41 6	+43 46	8.8, 10.3	1902.9	146.2	1.34	3	1865.6	144.4	1.28
	AB=Σ 2214			8.5, 8.8	1902.9	213.0	19.52	3	1830.4	211.7	19.42
8,144	Σ 2206	17 41 15	+19 2	8.1, 9.7	1904.3	246.7	1.21	4	1830.9	248.8	1.09
8,152	Σ 2213	17 42 0	+31 10	7.5, 8.0	1909.2	331.0	4.48	5	1836.6	333.3	4.45
* 8,153	Σ 2205	17 42 23	+17 45	8.3, 8.7	1897.7 1902.3 07.4 13.2	306.3 306.6 306.8 310.1	2.06 2.07 2.04 2.04	5 15 9 15	1830.9	291.0	2.52
8,158	Ho. 70	17 42 43	+30 34	8.1, 8.1	1900.9 04.0	106.8 104.4	0.42 0.42	6 6	1883.0	110.1	0.46
8,156	Σ 2212	17 42 46	+ 5 44	8.5, 8.8	1905.5	339.0	3.13	2	1835.6	341.4	3.13
8,155	Σ 2211	17 42 47	- 1 11	8.2, 9.2	1905.5	116.7	10.43	1	1830.5	115.5	9.70
8,160	Σ 2217	17 43 17	+14 48	7.4, 7.8	1909.5	282.8	6.79	5	1830.3	284.7	6.57
* 8,167	Σ 2225	17 43 28	+51 59	8.9, 9.2	1904.7	310.7	8.68	1	1830.3	319.4	9.07
	CD			8.4, 11.6	1904.7	335.1	5.90	1	1868.9	342.8	4.82
8,164	Σ 2224	17 43 31	+39 21	6.9, 10.1	1905.5	348.8	7.75	1	1831.1	352.1	7.52
* 8,162	A. Clark 7	17 43 34	+27 47	10.5, 11	1896.19 1901.90 04.58 07.56	45.5 62.2 68.0 79.9	1.42 1.53 1.60 1.18	3 3 2 3	1857.50	59.3	1.82
	A, BC=Σ 2220			3.8, 9.5	1907.5	244.8	33.52	2	1831.6	241.3	29.88

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 8,163	Σ 2215	h m s 17 43 49	° ′ +17 43	5.9, 7.9	1897.8 1901.7 06.5 13.2	° 291.3 292.2 289.6 286.9	" 0.68 0.66 0.80 0.66	10 12 9 15	1831.5	° 310.6	" 0.75
8,170	Σ 2226	17 44 5	+35 40	8.5, 11.5	1904.7	91.7	11.79	1	1829.8	92.5	10.96
8,168	Σ 2222	17 44 28	+14 50	7.5, 9.2	1903.5	59.1	2.29	3	1830.9	58.6	2.08
13,395	A. 697	17 44 45	+42 16	8.4, 8.5	1910.8	92.6	0.54	1	1904.4	93.5	0.46
8,177	β 358	17 44 49	+34 31	8.5, 10.0	1910.4	201.8	4.39	1	1879.4	202.8	4.29
8,172	β 824	17 45 1	- 1 51	8.5, 8.6	1912.1	354.1	0.61	7	1881.4	350.9	0.67
8,179	Σ 2228	17 45 39	+ 9 12	9.0, 9.5	1905.5	107.5	19.42	1	1829.6	107.3	18.58
13,397	Hu. 1182	17 46 0	+35 38	8.7, 9.1	1911.7	7.7	0.47	1	1905.4	11.7	0.54
8,190	A.G. 214	17 46 45	+34 38	9.2, 10.2	1908.8	203.8	4.51	2	1903.5	206.0	4.41
* 8,186	OΣ 337	17 46 57	+ 7 15	7.5, 8.0	1896.3 1901.6 12.5	281.4 275.0 267.2	0.45 0.36 0.32	3 10 10	1849.7	304.6	0.56
8,192	Σ 2232	17 47 12	+25 18	7.0, 8.5	1905.5	141.8	6.47	2	1830.8	142.9	6.51
8,199	Σ 2238	17 47 30	+37 46	9.2, 9.7	1909.5	287.9	2.21	9	1831.3	289.0	2.05
13,398	A. 1163	17 47 35	+ 7 43	8.7, 10.0	1912.8	106.2	0.91	3	1905.7	107.9	0.98
8,206	Σ 2237	17 47 38	+41 58	7.2, 9.5	1904.7	7.5	20.25	1	1829.7	8.2	20.37
* 8,203	Σ 2236	17 47 43	+35 27	7.8, 9.8	1904.7	95.2	3.09	2	1830.5	91.4	3.01
8,197	Σ 2233	17 48 7	+ 2 55	7.5, 10.3	1905.5	73.2	2.72	1	1832.2	68.9	2.04
	AC			13	1905.5	141.7	22.63	1			
	AD			12	1905.5	238.2	30.36	1			
* 8,210	OΣ 338	17 48 36	+15 20	6.6, 6.9	1897.2 1902.2 10.1 13.8 19.6	16.5 17.2 15.8 11.7 13.1	0.71 0.68 0.75 0.72 0.65	10 15 12 19 2	1845.2	44.3	0.68
8,208	Ho. 422	17 48 41	- 5 18	8.2, 9.0	1907.1	22.8	0.54	2	1893.6	19.8	0.48
8,215	Σ 2239	17 48 45	+28 15	8.5, 9.0	1905.5	318.6	2.55	2	1830.8	318.3	2.23
8,212	Ho. 561	17 49 13	- 5 55	6.5, 11.7	1907.6	328.8	33.11	1	1897.0	329.2	32.12
8,221	A. 234	17 49 31	+25 37	8.8, 9.1	1903.8 11.9	27.4 33.8	0.46 0.42	5 7	1901.6	30.5	0.41
8,232	Ho. 71	17 49 39	+55 23	9.2, 9.6	1909.4	229.7	3.39	1	1885.1	226.8	3.67
8,219	Σ 2240	17 49 51	+ 5 16	9.0, 9.7	1905.5	199.4	2.97	2	1832.0	200.4	2.93
* 8,228	A. Clark 8	17 49 59	+29 41	8.2, 8.2	1902.4 11.9	242.3 249.6	0.31 0.31	4 7	1857.6	224.0	0.35
8,225	Ku. 56	17 50 1	+19 5	9.6, 10.3	1914.7	129.8	2.58	1	1901.6	126.8	2.88

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,229	Ho. 562	h m s	° ′			°	"			°	"
		17 50 12	+20 56	9, 9.5	1906.9	259.0	3.72	3	1896.5	257.8	3.46
* 8,230	A. 235	17 50 15	+25 0	7.9, 8.1	1903.6 08.8 13.3	63.9 82.1 86.2	0.32 0.33 0.36	3 6 7	1901.6	65.2	0.20
8,234	Σ 2243	17 50 39	+36 6	8.3, 8.8	1908.7	44.8	1.59	2	1831.1	46.7	1.74
8,235	β 130	17 50 52	+40 1	5.9, 9.2	1909.7	122.0	1.63	6	1875.5	123.0	1.82
8,237	A. Clark 9	17 51 15	+29 49	8.3, 8.8	1901.6 11.4	236.1 235.7	1.09 1.02	14 14	1857.5	231.2	1.12
* 8,242	OΣ 339	17 52 58	+21 30	7.5, 9.9	1911.6	177.1	3.25	10	1852.6	181.3	2.78
* 8,245	Ho. 72	17 53 6	+33 27	9.0, 11.5	1899.7	1.3	7.23	1	1885.1	7.8	3.22
	AC			13	1902.2	32.0	9.19	2	1883.5	38.4	9.25
8,243	Σ 2245	17 53 7	+18 20	7.0, 7.0	1905.5	113.3	2.70	2	1829.2	114.0	2.62
* 8,241	Σ 2244	17 53 10	+ 0 4	6.9, 7.1	1905.5	278.9	1.05	1	1830.9	272.7	1.05
8,252	β 417	17 53 42	+39 26	8.1, 10.0	1910.4	278.7	1.49	5	1877.4	270.2	1.58
8,249	β 1299	17 53 56	+10 57	8.5, 8.5	1912.5	156.3	0.44	7	1900.5	153.6	0.51
8,260	Σ 2252	17 54 13	+ 2 3	8.0, 8.3	1905.5	23.6	4.01	2	1831.3	22.9	3.77
8,263	Σ 2255	17 54 29	+41 16	8.5, 10.5	1908.2	342.4	9.01	2	1830.7	342.7	8.31
8,259	Ho. 73	17 54 34	+35 42	9.0, 9.0	1904.7	39.8	2.10	1	1885.1	30.5	1.68
8,254	Ho. 423	17 54 35	+28 1	8.3, 11.0	1907.1	293.5	4.90	2	1890.5	292.4	4.46
8,261	Ho. 424	17 54 44	+28 16	8.0, 11.0	1906.5	210.2	1.44	1	1890.5	202.7	0.95
8,270	Σ 2258	17 54 46	+48 38	8.5, 8.7	1899.9	223.0	2.24	1	1830.1	221.4	2.60
8,271	Hu. 235	17 54 56	+45 52	6.7, 9.3	1908.8	266.7	1.47	2	1900.7	265.4	1.53
8,267	Ho. 425	17 55 10	+27 25	7.0, 12.0	1906.6	145.5	5.37	2	1891.5	142.5	5.31
8,253	Σ 2250	17 55 16	- 6 51	8.0, 9.0	1905.5	346.6	7.45	1	1830.8	346.5	7.72
8,268	Σ 2254	17 55 31	+12 27	8.3, 8.7	1905.5	265.1	3.43	2	1831.0	266.0	3.22
8,298	β 1202	17 57 48	+ 3 32	8.2, 9.3	1914.5	350.0	0.58	1	1890.5	353.1	0.74
8,301	Σ 2263	17 57 54	+26 33	8.2, 9.2	1904.6	160.8	7.56	1	1830.8	161.8	7.27
8,299	β 1125	17 57 57	+ 1 19	5.1, 9.9	1900.1 14.5	18.6 24.8	0.88 0.70	2 1	1889.4	14.9	1.01
8,302	Σ 2264	17 58 20	+21 36	4.9, 4.9	1905.5	259.7	6.44	2	1829.9	261.7	6.06
8,304	β 635	17 58 58	+ 1 37	9.0, 10.0	1914.5	120.5	1.31	1	1878.1	114.5	1.58
* 8,303	Σ 2262	17 59 0	- 8 11	5.0, 5.7	1900.2 06.0 13.6	258.6 259.2 262.1	1.90 1.67 1.88	5 4 4	1836.6	199.9	0.43
* 8,321	Σ 2267	17 59 15	+40 11	8.0, 8.0	1901.2 10.2	245.2 243.8	1.07 1.01	3 6	1830.7	234.2	1.41
13,407	A. 1165	17 59 41	+ 4 47	9.0, 10.2	1914.5	36.4	0.87	1	1905.7	34.9	0.97

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
* 8,326	Ho. 565	h m s	° ' "	8.3, 8.3	1909.5 19.6	° 69.9 76.4	" 0.43 0.37	5 2	1896.9	62.4	0.31
* 8,331	β 1127	18 0 19	+44 14	7.8, 9.7	1899.1 1912.1	141.6 132.1	0.70 0.79	5 6	1889.5	144.7	0.80
8,324	Σ 2265	18 0 26	+ 6 27	8.4, 9.4	1904.6	281.8	24.65	1	1831.3	282.7	24.49
8,327	Σ 2266	18 0 38	+ 3 29	8.0, 10.5	1904.6	186.3	8.67	1	1830.5	184.3	8.81
8,330	Σ 2269	18 0 46	+14 47	7.5, 10.8	1905.6	163.1	21.26	2	1830.3	164.4	20.10
* 8,337	Σ 2275	18 0 49	+39 21	9.0, 9.2	1899.6 1911.3	133.7 134.1	0.65 0.68	12 6	1832.2	127.9	1.08
8,335	Ho. 426	18 0 56	+26 39	7, 12	1906.7	198.5	12.31	1	1890.6	192.8	12.36
* 8,340	Σ 2272	18 1 40	+ 2 33	4.1, 6.1	1893.69 95.69 96.62 97.53 98.55 99.54 1900.57 01.60 02.55 03.56 04.53 05.56 06.60 07.60 08.63 09.57 10.61 11.53 12.63 13.65 14.64	308.9 295.9 289.2 282.5 272.4 260.7 246.4 226.5 212.2 198.1 188.9 178.2 170.6 164.5 158.5 154.6 151.6 148.3 145.7 143.8 140.2	2.34 2.65 2.22 1.97 1.81 1.65 1.61 1.58 1.67 1.74 1.98 2.10 2.32 2.62 2.89 3.18 3.38 3.55 3.79 4.11 4.27	1 1 13 9 11 11 9 10 9 14 11 12 11 16 21 12 9 13 12 12 10	1825.57	148.2	3.98
	A, a			4.5, 14.0	1908.9	217.2	45.00	5	1878.8	197.8	71.38
	A, b			13.0	1909.6	255.6	69.23	2	1905.6	252.1	69.96
	A, c			14.0	1909.0	71.0	104.98	5	1905.6	73.1	105.00
	A, d			15.0	1908.9	34.6	107.84	5	1878.8	49.6	87.21
	A, e			14.0	1908.8	101.5	118.76	4	1905.6	103.1	120.33
	A, f				1909.6	329.4	145.67	1	1905.6	329.0	142.42
	A, g			13.0	1908.7	231.6	154.19	5	1886.5	224.0	165.92
8,344	OΣ 534	18 1 49	+21 26	7.5, 9.5	1908.3	275.2	2.20	7	1853.0	272.8	2.13
* 8,353	OΣ 341	18 2 39	+21 26	6.4, 7.7	1901.4 05.9 13.2 19.6	86.1 90.5 92.8 85.0	0.30 0.38 0.34 0.28	9 9 14 2	1849.2	93.4	0.49
8,364	OΣ 343	18 2 58	+48 8	7.2, 10.2	1907.3	79.6	2.72	3	1846.7	77.5	2.64
8,363	Ho. 79	18 3 26	+33 25	9.0, 9.0	1910.8	16.3	0.58	1	1884.6	7.5	0.37
8,362	A.G. 216	18 3 58	+ 3 16	9.0, 9.1	1912.2	90.4	2.40	5	1902.5	88.4	1.89

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"			°	"
8,375	Σ 2282	18 4 6	+40 21	7.2, 8.2	1909.2	89.0	2.53	3	1831.3	93.2	2.44
* 8,372	A. Clark 15	18 4 10	+30 33	6, 10.5	1898.00 1902.49 13.56	308.1 317.2 345.7	0.93 1.20 1.53	5 2 2	1859.63	347.1	1.71
* 8,368	β 826	18 4 13	+9 45	9.6, 9.7	1914.9	332.0	0.77	1	1881.6	341.1	0.60
* 8,370	OΣ 524	18 4 14	+19 39	7.0, 8.3	1907.6 14.0	56.7 51.1	0.39 0.29	3 9	1853.4	86.5	0.37
8,383	Σ 2290	18 4 46	+50 0	8.5, 10.8	1912.9	354.1	3.78	3	1832.2	351.2	3.89
8,379	Hu. 314	18 5 12	+18 37	8.3, 8.5	1907.6 13.1	147.6 140.2	0.48 0.47	6 9	1901.5	146.6	0.35
8,391	OΣ 344	18 5 15	+49 42	6.7, 10.8	1911.8	149.5	2.00	3	1847.7	155.1	2.17
8,385	Σ 2285	18 5 50	+13 28	8.2, 10.0	1912.5	332.3	3.43	14	1830.3	338.7	3.46
* 8,380	Σ 2281	18 5 50	+3 58	5.7, 7.2	1896.60 99.68 1900.58 01.63 02.58 03.63 05.70 07.58 09.59 10.70 11.54 12.78 13.65 15.62	229.2 239.4 224.8 236.2 228.6 233.0 196.2 128.6 114.7 119.4 84.4 78.2 75.4 75.1	0.42 0.40 0.31 0.22 0.36 0.12 0.18 0.27 0.29 0.29 0.21 0.32 0.34 0.31	2 2 3 1 2 2 2 1 3 2 2 2 1 1 3	1831.05	259.7	1.54
* 8,384	Σ 2283	18 5 56	+6 8	7.2, 7.7	1900.3 03.6 08.0 13.7	81.6 82.6 83.2 82.6	0.97 1.03 0.87 0.81	8 10 7 11	1832.6	91.9	1.20
8,389	Hu. 315	18 5 56	+23 33	9.3, 9.3	1907.4	48.8	0.45	4	1901.7	47.1	0.44
* 8,398	Σ 2289	18 6 48	+16 27	6.0, 7.1	1897.5 1902.1 07.5 11.8	229.9 230.3 230.1 228.2	1.20 1.21 1.16 1.13	16 15 10 13	1830.0	243.1	1.20
8,401	Hu. 316	18 7 2	+18 15	9.0, 10.1	1907.6 12.3	150.2 155.5	1.77 1.69	6 8	1901.5	156.8	1.75
8,416	Hu. 674	18 7 52	+50.23	7.5, 8.0	1910.6	276.8	0.43	2	1904.3	279.0	0.47
8,408	Hu. 317	18 8 2	+17 12	8.5, 8.8	1909.9	20.0	1.83	15	1901.5	21.4	1.87
8,411	A. 238	18 8 17	+25 18	8.5, 9.5	1912.5	93.7	0.49	11	1901.5	89.5	0.49
8,410	A. 83	18 8 39	-3 31	8.4, 8.5	1914.5	318.7	0.70	1	1900.4	312.8	0.78
* 8,421	Σ 2292	18 9 8	+27 37	8.0, 8.1	1906.5 11.7	267.6 267.9	1.18 1.07	9 12	1830.4	261.2	1.39
8,418	OΣ 345	18 9 9	+5 48	7.3, 10.3	1914.5	66.2	1.38	1	1845.2	65.0	1.04
* 8,428	Σ 2295	18 9 43	+31 33	8.2, 10.3	1905.6	172.1	10.32	2	1831.4	173.9	11.60

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,438	β 1091	h m s	° ′	8.6, 8.6	1901.9	°	"	6	1888.8	°	"
		18 10 5	+38 34			30.8	0.36			38.1	0.53
8,440	Σ 2298	18 10 19	+41 21	8.5, 9.7	1904.6 11.6	180.2 177.2	2.27 2.18	2 2	1831.5	185.5	2.39
8,430	Hu. 196	18 10 20	+ 8 57	9.0, 9.2	1906.7	345.3	0.35	1	1900.6	345.1	0.25
* 8,433	Σ 2294	18 10 42	+ 0 9	7.4, 7.7	1900.1 02.1 06.9 13.0	104.0 89.0 100.7 101.7	0.28 0.23 0.41 0.39	2 4 3 5	1831.0	91.9	1.06
8,447	Σ 2296	18 11 42	- 3 24	6.7, 10.3	1904.6	7.0	3.21	1	1829.5	7.0	3.33
8,454	OΣ 346	18 12 11	+19 44	7.5, 8.3	1910.0	328.7	5.38	3	1847.9	327.7	5.50
8,464	Ho. 269	18 13 7	+20 12	9.5, 10.2	1907.5	160.9	6.72	8	1895.4	159.3	6.48
8,466	Hu. 319	18 13 19	+22 47	9.2, 9.6	1906.6	79.6	0.25	1	1901.7	71.7	0.34
8,476	β 1274 BC	18 13 23	+56 33	9.8, 10.6	1899.4	143.4	0.72	1	1892.4	147.1	0.88
	BD			10.4	1899.4	7.6	4.38	1	1892.4	8.5	5.03
8,479	Σ 2304	18 14 41	+40 14	8.1, 9.4	1904.5	68.6	5.13	1	1830.9	68.5	4.93
8,484	A.G. 218	18 15 42	+ 3 17	9.0, 9.3	1909.6	277.7	2.68	2	1903.3	279.7	2.60
* 8,486	A.G. 219	18 15 54	+ 2 4	9.1, 10.2	1909.6	31.3	2.88	2	1903.0	35.9	7.31
* 8,485	Σ 2303	18 16 1	- 8 2	6.7, 9.2	1905.6	223.7	2.36	1	1831.2	216.4	3.22
8,489	Hu. 197	18 16 8	+10 14	8.2, 9.3	1902.7	32.7	0.37	1	1900.6	28.0	0.36
8,490	Perrine	18 16 17	+14 0	8.8, 10.2	1908.8	3.8	3.49	4	1900.2	3.8	3.39
8,497	A.G. 221	18 16 49	+21 18	9.0, 9.4	1904.9 11.7	190.6 190.8	1.35 1.25	10 8	1901.7	194.4	1.42
	AC			12.0	1904.6	9.5	13.24	2			
8,501	Σ 2309	18 17 4	+25 30	8.5, 9.0	1903.6	351.0	4.25	1	1830.8	354.7	3.52
8,504	Σ 2310	18 17 30	+22 46	7.0, 10.3	1903.6	237.3	5.22	1	1830.8	233.8	4.97
* 8,507	β 640	18 17 50	+27 29	7.5, 12.2	1909.6	329.3	1.99	1	1878.9	346.2	2.37
8,518	† Lewis 20	18 18 8	+20 27	9.0, 9.5	1905.2 12.4	335.3 336.6	2.31 1.72	2 3			
8,510	Σ 2312	18 18 12	+28 18	8.5, 9.5	1903.7	336.2	1.47	2	1831.0	336.8	1.49
8,511	Ho. 430	18 18 24	+20 27	8.5, 9.0	1903.9 10.6	193.7 194.3	2.56 2.34	7 12	1890.6	191.8	2.17
8,514	β 641	18 18 35	+21 27	7.1, 9.0	1898.0 1902.3 11.1	345.7 344.3 344.9	0.97 0.90 0.91	12 14 10	1880.1	349.2	1.00
* 8,512	Σ 2311	18 18 44	+11 24	8.9, 9.9	1905.7	157.4	5.17	2	1830.3	170.7	8.65
8,516	A.G. 222	18 18 47	+14 11	8.6, 8.8	1912.4	142.9	1.64	11	1900.2	148.8	1.88
8,515	Hu. 238	18 18 51	+ 9 54	8.6, 9.2	1908.1	344.9	1.13	2	1900.6	163.6	0.96

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,524	Hu. 581	h m s	° ′			°	"			°	"
8,524	Hu. 581	18 19 31	+14 56	8.4, 9.0	1908.0	124.8	0.35	6	1902.6	119.9	0.31
8,531	Σ 2314	18 20 19	+23 24	8.4, 9.6	1904.9 12.1	327.2 327.2	2.50 2.22	3 5	1831.0	328.5	2.43
8,534	Ho. 83	18 20 21	+27 29	8.7, 8.7	1907.2 12.4	90.1 88.8	0.61 0.58	9 6	1884.8	82.3	0.4±
8,530	Σ 2313	18 20 45	- 6 39	7.2, 8.5	1904.6	198.3	6.13	1	1832.2	199.0	6.13
	† Lewis	18 21 50	+27 21	9.5, 10	1901.5	137.9	4.49	9			
* 8,545	Ho. 84	18 21 51	+27 21	9, 11	1905.8	318.5	3.76	7	1885.7	312.9	2.02
* 8,548	Σ 2315	18 21 59	+27 21	7.0, 8.0	1895.7 98.6 1901.6 04.4 11.7 14.2	216.4 204.4 199.5 197.1 184.8 182.8	0.31 0.31 0.29 0.27 0.30 0.26	5 4 8 5 10 8	1830.7	281.1	0.59
* 8,543	β 1203	18 22 15	+ 0 43	7.5, 7.7	1900.5 11.5	72.0 78.0	0.25 0.27	7 2	1890.7	67.8	0.30
8,550	Σ 2317 rej. BC	18 22 18	+26 2	10.8, 11.0	1908.0	138.8	1.31	3	1904.3	322.1	0.98
8,552	Ho. 85	18 22 23	+28 2	8.0, 12.0	1905.6	194.4	5.05	2	1885.1	196.2	4.70
8,551	Σ 2318	18 22 25	+25 57	8.0, 10.2	1901.0	253.5	20.91	2	1829.7	257.2	20.51
* 8,574	Σ 2323	18 22 49	+58 44	4.7, 7.7	1899.5 1910.5	0.8 357.8	3.20 3.53	1 2	1833.2	5.9	3.14
* 8,575	Hu. 66 AB, C =OΣ 351	18 23 12	+48 44	7.3, 8.0	1898.6 1901.1	21.1 20.8	0.57 0.56	7 6	1846.4	25.0	0.49
8,571	β 134 =OΣ 543	18 23 14	+46 51	7.9, 9.8	1899.8 1912.4	132.6 137.1	1.07 1.02	13 5	1875.2	133.7	1.07
8,561	OΣ 350	18 23 14	+ 6 22	7.4, 9.0	1912.1	167.0	1.89	2	1852.7	168.9	1.72
8,568	β 464	18 23 57	+ 6 30	8.5, 9.5	1914.7	113.0	0.83	1	1877.2	111.3	1.20
8,581	Ho. 433	18 24 22	+28 53	8.2, 12.5	1907.1	328.1	9.77	4	1890.6	327.4	9.06
8,579	Σ 2319	18 24 28	+19 14	7.2, 7.6	1904.8	190.1	5.39	4	1830.4	191.0	5.61
	AC			10.0	1904.6	274.9	39.72	1	1829.4	279.0	38.42
* 8,584	Σ 2320	18 24 40	+24 39	7.1, 9.0	1906.3	5.8	1.54	5	1831.5	11.4	1.79
8,591	Hu. 320	18 25 18	+16 11	9.2, 9.6	1913.7	143.8	1.78	2	1901.6	143.7	2.04
8,594	Σ 2321	18 26 9	+ 1 8	7.9, 9.5	1904.7	193.2	6.57	1	1830.1	190.6	6.68
8,598	Σ 2327	18 26 17	+29 53	7.3, 11.0	1905.6	313.5	19.55	3	1830.8	314.9	19.27
8,599	Ho. 434	18 26 17	+29 34	7.3, 12.2	1907.1	186.3	13.04	4	1891.6	186.3	11.49
8,595	Σ 2322	18 26 22	+ 4 1	5.7, 11.0	1904.7	171.0	19.96	1	1828.7	170.5	19.57
8,607	Σ 2328	18 26 35	+29 53	8.0, 8.3	1905.4	72.2	3.60	4	1830.4	73.0	3.45

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,610	Hu. 583	h m s	° ′			°	"			°	"
8,610	Hu. 583	18 27 0	+13 45	9.0, 9.5	1908.4	306.9	0.75	5	1902.7	306.1	0.83
8,609	Σ 2324	18 27 10	+ 1 21	8.2, 8.5	1904.7	143.5	2.29	1	1829.6	146.0	2.43
* 8,615	Σ 2329	18 27 47	+ 6 25	7.7, 9.0	1904.7	47.0	4.13	1	1830.6	43.3	4.18
8,621	Hu. 244	18 28 5	+11 59	8.9, 12.2	1912.5	257.6	0.94	1	1900.5	255.6	1.09
8,625	Σ 2335	18 28 5	+34 13	8.5, 11.5	1904.7	319.7	11.86	1	1833.4	321.1	12.07
	AC			10.3	1904.7	152.9	24.47	1	1833.4	151.0	23.50
8,628	Σ 2333	18 28 19	+32 12	7.5, 8.1	1904.7	334.2	6.07	1	1831.2	335.3	6.28
* 8,622	OΣ 354	18 28 23	+ 6 44	7.2, 8.0	1899.3 1906.6	168.3 172.1	0.82 0.85	8 6	1846.8	154.5	0.79
8,633	Hu. 245	18 29 18	+11 44	8.2, 9.2	1908.4 11.5	54.7 52.9	2.15 2.17	5 10	1899.1	52.4	2.06
8,634	Σ 2336	18 29 24	+13 46	8.7, 9.8	1904.8	7.4	6.42	5	1830.3	7.5	6.31
8,642	Hu. 322	18 30 26	+17 40	8.0, 8.2	1914.1	74.3	0.29	5	1901.6	86.3	0.19
	AC=Σ 2339			7.2, 8.0	1904.2 12.8	274.1 271.5	2.26 2.20	2 9	1830.0	271.5	2.33
8,648	Ho. 86	18 30 50	+35 7	8.0, 8.3	1900.2	180.7	0.28	2	1886.7	181.7	0.37
8,651	Σ 2341	18 31 27	+11 23	8.5, 9.7	1904.7	265.7	15.51	1	1828.6	266.5	15.42
8,658	Σ 2344	18 32 4	+28 40	8.5, 12.0	1905.0	177.0	1.73	3	1829.7	179.0	1.38
* 8,660	Σ 2345	18 32 18	+21 1	8.4, 10.1	1904.2	206.2	8.63	2	1832.3	185.1	7.38
* 8,662	OΣ 359	18 32 24	+23 33	6.6, 6.9	1911.7 14.2	328.7 331.7	0.27 0.23	9 9	1849.5	354.1	0.66
* 8,659	OΣ 357	18 32 27	+11 40	7.5, 7.6	1898.8 1903.9 11.6 14.3	250.1 237.8 236.0 231.3	0.38 0.41 0.30 0.37	9 15 14 8	1845.2	275.5	0.48
* 8,663	OΣ 358	18 32 32	+16 55	6.8, 7.2	1897.7 1902.4 09.5 19.6	193.0 192.4 190.6 187.5	1.83 1.87 1.86 1.98	15 15 11 1	1845.4	227.0	1.23
8,667	A. 249	18 32 59	+24 48	9.3, 9.5	1908.6	278.5	1.03	2	1901.5	274.9	0.87
8,671	Hu. 247	18 33 28	+10 12	9.0, 9.3	1909.9	40.3	0.48	3	1900.4	45.8	0.46
8,684	Σ 2351	18 33 50	+41 13	7.4, 7.4	1904.8	340.2	5.02	1	1831.0	339.8	5.23
8,681	Σ 2349	18 33 52	+33 24	5.5, 10.7	1904.7	204.9	7.31	1	1830.2	205.5	7.33
8,677	Σ 2347	18 34 5	- 0 27	7.5, 9.4	1905.6	256.5	3.04	1	1829.8	259.3	3.17
8,689	Σ 2352	18 34 17	+34 48	7.3, 10.3	1904.7	284.9	15.33	1	1830.8	283.6	15.22
8,687	Hu. 198	18 34 46	+ 8 46	8.5, 8.6	1907.7	189.1	0.15	1	1900.5	195.2	0.22
8,690	OΣ 360	18 34 57	+ 4 47	6.5, 10.0	1908.7	289.4	1.17	1	1849.7	292.6	1.11

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ′			°	"		°	"	
8,698	Ho. 87	18 35 16	+16 28	8.0, 8.0	1900.2 11.5	282.9 288.0	0.36 0.32	9 2	1883.7	258.7	0.28
8,697	Hu. 248	18 35 18	+ 9 4	9.5, 9.6	1908.6	113.2	2.13	2	1900.5	113.5	2.03
8,701	Σ 2356	18 35 26	+28 38	8.0, 9.0	1898.1 1902.1 09.0 11.8	57.6 58.5 55.5 57.3	0.99 1.01 1.01 1.02	6 13 5 7	1831.4	47.1	1.03
8,705	Σ 2358	18 35 44	+30 39	8.8, 9.0	1903.7	221.6	2.75	2	1831.4	216.5	2.58
8,712	Σ 2362	18 35 49	+36 0	7.1, 8.4	1902.7	182.0	4.01	2	1831.0	180.2	3.96
8,694	† Lewis 25	18 36 2	+28 47	9.0, 10.0	1898.1 1901.9	252.9 255.4	1.27 1.16	6 8			
8,711	Σ 2360	18 36 7	+20 52	7.5, 8.7	1903.7	2.2	2.49	2	1831.1	5.7	2.53
* 8,721	Σ 2364	18 37 0	+24 38	8.0, 10.2	1906.0 11.2	177.1 177.8	7.81 8.06	6 4	1831.5	182.2	6.51
8,732	Σ 2368	18 37 6	+52 17	7.2, 7.4	1904.8	329.2	1.86	1	1831.1	331.3	1.96
8,717	β 1328	18 37 12	+ 2 57	8.6, 9.4	1908.7	283.7	1.94	1	1903.4	285.2	1.88
13,425	Hu. 1190	18 37 20	+38 2	9.5, 9.5	1911.3	171.3	1.72	2	1905.4	172.5	1.71
8,728	H. 1336	18 37 36	+30 14	8.2, 11.5	1906.8	90.5	17.57	1	1828+	89.0	8±
	AC			11.0	1906.8	176.8	33.15	1			
	AD			11.0	1906.8	296.0	34.52	1	1828+	300±	15±
	AE			13.0	1906.8	333.0	31.84	1			
8,731	Ho. 437	18 37 40	+31 34	8.3, 8.5	1901.2 06.7	117.0 120.0	0.32 0.42	5 6	1892.3	115.7	0.35
	CD			11.7	1901.2 06.5	340.4 339.9	3.70 3.52	3 5	1893.1	337.3	2.34
	AE			12.7	1906.2	289.7	22.51	2			
8,734	H. 1337	18 38 4	+31 30	9 , 12	1904.7	163.7	9.00	1	1828+	174.9	6±
* 8,736	Σ 2367	18 38 23	+30 14	7.0, 7.5	1897.5 99.6 1900.7 01.6 02.6 03.6 04.7 05.7 06.8 13.7 14.7 15.7 19.6	267.5 258.0 84.3 89.5 78.2 70.1 81.8 74.4 74.4 77.4 76.7 71.6 85.2	0.25 0.24 0.18 0.24 0.22 0.18 0.30 0.31 0.40 0.24 0.31 0.28 0.42	2 4 5 4 1 3 1 1 1 8 3 2 1	1833.9	68.3	0.4±
	AB, C			8.4	1903.0 13.7	193.0 193.1	14.14 14.36	6 4	1832.5	193.9	14.13
* 8,759	Σ 2384	18 38 30	+67 3	8.0, 8.5	1898.8	310.3	0.49	3	1832.3	307.2	0.82

† B.D. + 28° 30' 45".

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,740	β 136	h m s 18 39 13	$^{\circ}$ ' + 5 40	9.2, 9.7	1906.2	$^{\circ}$ 10.8	" 4.57	2	1874.8	$^{\circ}$ 8.0	" 4.39
8,743	Σ 2371	18 39 14	+27 35	8.5, 8.5	1903.6	55.9	9.53	1	1829.7	55.5	9.55
8,749	O Σ 361	18 40 3	+ 5 35	7.5, 8.2	1903.7	170.6	22.27	1	1848.3	172.5	22.67
* 8,751	Σ 2369	18 40 9	+ .2 33	7.5, 8.0	1900.9 05.4	92.0 93.6	0.96 0.83	5 4	1830.6	98.2	1.54
8,767	Σ 2376	18 40 50	+30 20	7.7, 8.4	1905.7	63.7	22.36	2	1830.5	63.8	22.30
* 8,776	Σ 2375	18 41 49	+ 5 25	6.2, 6.6	1900.9 05.2	114.0 113.3	2.06 2.24	8 9	1829.1	108.1	2.23
8,764	Ho. 88	18 42 5	- 9 33	9, 9	1907.6	211.1	2.31	1	1885.6	208.1	2.03
8,789	Σ 2381	18 42 32	+28 11	8.0, 10.0	1905.2	122.8	8.76	2	1830.4	123.1	8.50
8,779	Σ 2379	18 42 36	- 1 2	5.6, 7.4	1908.7	122.2	12.80	1	1832.5	121.5	13.22
	AC			11.2	1908.7	146.3	25.03	1	1880.0	145.5	27.53
8,794	Σ 2392	18 42 40	+39 9	8.2, 10.2	1910.0	314.6	2.95	4	1831.6	317.2	2.70
	AC			9.3	1911.3	177.3	23.65	2	1831.2	178.4	23.32
8,799	Σ 2395	18 42 55	+46 4	7.7, 10.1	1904.8	307.7	8.09	1	1831.7	309.9	8.25
8,806	Hu. 755	18 43 1	+51 56	8.7, 9.0	1912.8	120.0	0.54	2	1904.4	117.7	0.68
8,797	Σ 2390	18 43 7	+34 26	7.3, 8.7	1905.7	155.2	4.21	2	1830.1	157.9	4.23
8,795	Σ 2385	18 43 9	+16 54	8.3, 10.7	1905.0	35.8	4.61	3	1829.3	36.8	4.28
8,822	Σ 2397	18 44 21	+31 19	7.2, 9.5	1905.7	265.2	3.90	2	1830.5	267.4	3.72
8,819	O Σ 362	18 44 41	+10 34	7.8, 11.9	1907.4	341.6	7.62	3	1853.2	338.7	7.63
* 8,824	Σ 2396	18 44 57	+10 41	7.7, 11.2	1905.7	324.1	33.09	2	1829.6	232.8	11.74
* 8,830	Σ 2400	18 45 33	+16 10	8.2, 11.1	1896.5 1901.6 19.6	185.8 184.5 173.8	1.91 2.20 3.44	7 6 1	1892.4	187.2	1.87
	AC			10.6	1896.8 1901.5 14.6 19.6	188.1 184.9 173.2 178.1	2.99 3.19 3.43 4.77	8 7 1 1	1831.2	304.2	2.85
	BC				1899.6 1919.6	189.4 194.4	0.91 0.74	4 1			
	AD				1895.6 96.6 1900.7 † 01.7 † 19.6	201.3 186.7 157.1	0.70 0.50 0.39	2 2 1			
8,849	β .971	18 45 34	+49 21	6.5, 8.5	1897.4 1900.7	11.6 8.3	0.30 0.27	1 1	1879.9	354.7	0.54
* 8,861	Σ 2410	18 45 51	+59 15	8.2, 8.7	1899.5	93.8	1.48	1	1833.2	97.5	1.49
13,432	Hu. 936	18 45 58	+33 56	8.8, 9.1	1913.3	103.0	1.81	8	1904.5	102.1	1.96

† Not seen.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,844	Σ 2402	h m s 18 46 12	° ' " +10 35	8.0, 8.4	1898.2 1901.8 06.8	° 206.3 206.5 206.5	" 0.91 0.95 1.07	8 .7 7	1830.2	° 197.7	" 0.74
8,850	Hu. 254	18 46 41	+ 8 2	8.9, 13.5	1906.7	168.7	1.03	1	1900.6	157.2	1.19
8,852	β 265	18 46 44	+11 26	7.1, 9.1	1905.4 11.5	229.5 228.7	1.32 1.30	4 7	1875.3	235.9	1.46
8,858	Σ 2406	18 46 54	+26 20	7.2, 11.2	1904.7	357.6	4.37	1	1830.5	4.7	4.87
8,864	Ho. 440	18 47 4	+32 28	5.5, 13	1906.8	176.3	19.71	1	1892.7	176.9	19.00
8,874	Σ 2409	18 48 16	+13 26	8.0, 9.3	1899.6	29.4	1.11	1	1829.4	33.4	0.97
8,876	Σ 2408	18 48 26	+10 41	7.5, 8.7	1910.2	91.3	1.97	2	1830.7	96.5	2.30
8,877	Hu. 199	18 48 37	+11 42	8.7, 9.1	1902.2	5.3	0.30	2	1900.6	3.5	0.23
8,881	Σ 2412	18 49 9	+13 55	8.4, 8.5	1899.6	54.1	1.30	1	1830.9	53.3	1.27
8,887	β 421	18 49 26	+43 18	9.1, 9.3	1910.6	295.5	0.99	5	1877.2	289.9	1.00
8,885	Hu. 258	18 49 30	+11 31	8.9, 9.4	1906.6	213.8	2.58	3	1900.6	216.1	2.53
8,896	H. 1354	18 50 19	+36 16	10, 10	1911.7	185.0	6.84	1	1828+	187.0	8±
8,901	Ho. 89	18 50 46	+37 22	8.0, 12.0	1906.7	170.2	6.11	2	1886.2	166.6	6.01
* 8,905	Σ 2415	18 51 19	+20 31	6.6, 8.5	1909.3 11.3	293.0 292.3	1.95 1.87	6 9	1831.6	298.7	2.01
* 8,909	β 137	18 51 22	+37 17	8.2, 8.7	1897.5 1909.6	130.9 135.0	1.34 1.28	10 8	1875.3	123.8	1.15
	AC			11.5	1897.0 1908.8	140.8 142.5	18.68 19.60	2 2	1880.5	142.0	17.92
8,912	β 647	18 52 4	+13 44	9.0, 9.2	1905.7	9.1	0.96	2	1877.7	11.5	1.01
8,926	β 1255	18 52 48	+48 46	5.8, 12.5	1900.6	89.7	1.43	1	1891.6	88.0	1.56
8,915	Ho. 90	18 52 52	+37 13	8, 12	1908.8	223.2	3.92	4	1885.2	225.4	3.76
8,932	OΣ 365 AC=Σ 3130	18 53 40	+44 7	7.4, 11.1	1897.4	262.3	2.58	3	1833.4	262.9	2.69
8,927	Hu. 676	18 53 47	+14 44	7.2, 10.0	1905.7	103.2	1.62	1	1902.7	79.7	1.41
* 8,930	Σ 2422	18 54 5	+25 59	7.6, 7.7	1899.0 1902.6 10.5	93.7 93.6 93.4	0.71 0.87 0.79	6 15 15	1832.1	105.7	0.85
* 8,933	β 648	18 54 11	+32 48	6.0, 9.5	1895.59 96.59 97.52 98.63 99.44 1900.66 01.60 02.63 06.69 07.73 12.76 13.71	237.9 231.5 232.8 228.9 222.4 225.7 220.0 217.3 179.0 182.2 83.8 64.2	1.49 1.28 1.20 1.33 0.96 1.14 1.11 1.00 0.42 0.51 0.42 0.60	3 5 5 3 1 3 2 1 1 2 1 3	1878.47	312.5	0.60

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
8,937	A. 260	h m s 18 54 45	° ′ +32 3	8.9, 9.1	1912.4	° 245.6	" 0.87	5	1901.7	° 243.0	" 0.77
8,936	Ho. 91	18 54 55	+17 15	6.0, 11.7	1907.1	132.6	6.29	4	1886.7	132.5	6.27
8,939	Hu. 330	18 55 23	+19 29	9.0, 9.3	1908.0 11.6	30.7 31.0	0.73 0.87	6 5	1901.6	31.1	0.75
* 8,940	Σ 2424	18 55 38	+13 31	5.7, 9.2	1895.6 1904.0	264.5 267.0	17.03 16.80	3 6	1831.3	241.6	18.66
8,950	Σ 2429	18 55 46	+36 19	8.3, 9.8	1904.8	285.6	5.50	1	1829.8	289.5	5.32
8,942	Hu. 331	18 55 47	+18 3	8.4, 12.4	1909.6	188.6	0.77	2	1901.6	193.4	0.82
8,945	Hu. 332	18 55 53	+22 24	8.8, 9.0	1909.6	196.0	0.39	3	1901.8	197.7	0.38
8,953	β 649	18 56 5	+32 22	8.5, 11.7	1899.3 1912.2	7.5 11.8	1.59 1.61	6 2	1878.5	12.8	1.57
* 8,966	Σ 2438	18 56 14	+58. 8	7.0, 7.6	1899.8 1914.4	31.5 20.1	0.33 0.48	4 3	1832.5	340.6	0.72
8,961	Σ 2430	18 56 26	+29 30	8.5, 8.5	1908.8	0.3	1.91	2	1830.5	359.3	1.93
8,954	Σ 2426	18 56 30	+12 47	6.8, 8.2	1906.4	259.9	16.65	4	1829.4	259.8	16.89
	BC			8.2, 12.5	1905.7	168.2	3.08	2			
8,956	Σ 2428	18 56 33	+14 48	8.0, 9.8	1904.8	286.4	6.96	2	1831.0	288.6	6.45
8,960	Hu. 677	18 56 45	+12 57	8.8, 9.5	1905.7 14.7	39.7 41.5	1.06 1.83	1 1	1902.7	43.0	1.82
8,964	Hu. 678	18 57 3	+12 8	8.0, 10.5	1907.0	1.9	3.01	5	1902.7	359.5	2.98
8,982	Ho. 92	18 58 2	+32 25	9.0, 9.1	1907.4	37.6	1.19	3	1886.2	41.9	1.06
* 8,988	Σ 2437	18 58 36	+19 4	7.8, 8.0	1900.4 04.3 09.5 14.1	62.4 59.3 56.8 58.4	0.72 0.82 0.77 0.76	9 10 8 9	1830.8	80.8	1.08
8,987	Ho. 93	18 58 38	+14 20	7.7, 12.0	1906.9	325.8	1.15	7	1883.7	334.6	1.07
* 8,986	Σ 2434	18 58 53	- 0 49	7.9, 8.4	1907.6	123.5	23.71	1	1831.6	147.0	25.56
9,011	Σ 2450	19 0 22	+52 9	6.9, 9.6	1904.8	295.5	4.99	1	1832.2	305.1	4.88
9,012	Σ 2448	19 1 0	+35 38	8.2, 8.2	1904.8	191.0	2.45	1	1831.6	193.2	2.37
* 9,023	Σ 2451	19 1 10	+51 29	8.7, 9.0	1899.5	69.8	2.06	1	1831.3	58.1	2.60
9,018	Bird 4	19 1 36	+32 39	8.4, 8.6	1910.4	312.1	2.43	3	1881.4	315.2	2.66
9,014	β 466	19 1 41	+10 43	9.2, 10.0	1911.2	164.1	1.79	7	1877.7	165.1	1.71
9,020	β 287	19 1 58	+13 45	3.0, 12	1897.7	58.1	5.85	5	1878.5	59.6	4.92
9,029	Dawes 9	19 2 27	+43 46	7.4, 11.0	1908.8	177.5	1.93	3	1859.8	179.5	2.16
* 9,035	Σ 2453	19 2 37	+40 1	8.2, 10.7	1908.8	94.2	-14.13	2	1829.8	100.3	15.13
9,032	Ho. 95	19 2 37	+27 10	8.0, 8.0	1904.6 09.6	221.9 216.6	0.42 0.38	3 8	1885.8	218.8	0.38

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist. "	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			°	"		°	"	
* 9,038	Σ 2454	19 3 14	+30 19	8.0, 9.2	1898.7 1904.7 12.3	244.4 249.6 253.7	0.94 0.91 0.82	6 9 11	1831.5	204.0	0.75
* 9,054	Σ 2478	19 3 17	+69 20	8.8, 8.8	1899.5	303.2	1.16	2	1832.5	290.2	1.33
* 9,043	Σ 2455	19 3 42	+22 3	7.2, 8.3	1898.6 1902.6 10.0	81.0 77.6 71.7	3.46 3.41 3.71	5 19 7	1828.8	144.5	4.93
9,046	Σ 2458	19 3 52	+27 38	8.5, 9.0	1908.4	227.6	10.97	3	1829.2	227.7	10.93
9,045	Σ 2457	19 3 57	+22 28	7.2, 8.7	1911.7	200.9	10.57	2	1828.7	201.3	10.10
9,049	Σ 2459	19 4 18	+25 51	8.4, 9.1	1908.8	232.5	13.71	2	1830.7	233.0	13.75
9,055	Σ 2465	19 4 52	+30 33	8.3, 10.2	1908.7	246.9	1.51	1	1831.1	250.1	1.21
* 9,056	Σ 2466	19 4 58	+29 41	8.0, 8.5	1910.8	105.8	2.28	12	1831.0	109.3	2.28
9,059	Ho. 98	19 5 14	+26 58	8.0, 8.0	1900.4 08.5	140.2 139.9	0.33 0.29	8 9	1886.4	163.6	0.27
9,060	Ho. 99	19 5 14	+30 24	9.0, 9.0	1909.2	133.5	0.48	4	1882.0	128.0	0.3±
9,064	Σ 2469	19 5 14	+38 48	7.6, 8.7	1908.7	123.7	1.48	4	1831.1	120.9	1.27
9,058	Ho. 570	19 5 22	+19 6	9.0, 10.5	1909.4	223.6	10.43	5	1894.1	224.0	10.35
* 9,063	Ho. 442	19 5 37	+19 6	9.0, 10.5	1909.7	94.6	3.74	9	1893.2	89.4	2.28
9,061	Σ 2464	19 5 43	+11 45	8.2, 10.5	1899.6	23.9	1.09	1	1830.4	19.2	1.36
13,448	A. 704	19 5 45	+46 45	9.0, 9.3	1910.8	282.2	1.13	1	1904.5	281.3	1.02
	† Lewis	19 6 5	+27 29	9.0, 10.0	1907.7	176.8	4.70	2			
9,071	Ho. 443	19 6 14	+19 17	9.5, 9.5	1908.1	116.9	2.93	6	1893.8	111.1	2.76
9,074	Ho. 444	19 6 19	+26 49	8.4, 10.0	1899.6 1907.1	77.0 77.1	1.03 1.35	3 8	1893.1	75.9	1.08
9,084	Σ 2475	19 7 6	+17 36	8.4, 10.5	1909.7	323.8	6.42	1	1830.5	322.1	6.30
9,087	A. 150	19 7 8	+20 22	8.9, 9.0	1909.6	100.6	0.46	2	1900.6	99.8	0.38
9,097	A. 151	19 8 11	+21 8	7.6, 8.9	1909.6	125.5	0.47	3	1900.6	125.5	0.54
9,110	A. 590	19 8 15	+41 32	9.0, 9.1	1913.9	131.1	0.67	1	1903.6	131.6	0.46
9,095	β 1204	19 8 16	+ 2 29	7.7, 8.5	1900.9 06.9	11.4 8.3	0.35 0.32	6 4	1890.6	3.8	0.44
	AB, G=Σ 2476			6.2, 11.0	1906.8	213.7	31.08	2	1830.6	214.7	31.41
9,104	Hu. 334	19 8 31	+18 1	8.5, 11.0	1909.7	245.6	1.12	1	1901.5	244.9	1.58
* 9,114	Secchi 2	19 8 37	+38 40	8.7, 8.7	1914.10	104.0	0.35	6	1858.22	95.5	0.40
	A, BC=Σ 2481			8.0, 8.0	1909.0 13.2	219.0 217.3	4.11 4.24	5 13	1830.5	234.3	3.83

† B.D. + 27° 3257 ?

β.G.C.	Name.	1925°.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,116	β 139	h m s 19 9 13	° ' " +16 43	6.7, 8.0	1910.7	° 139.1	" 0.61	4	1875.9	° 139.5	" 0.72
	AD			13	1909.7	102.6	28.62	1	1899.4	103.6	27.75
9,117	Ho. 445	19 9 19	+24 27	9.2, 10.3	1907.2	244.1	5.08	5	1893.7	244.5	4.78
9,120	A. 264	19 9 35	+24 27	8.0, 13.5	1906.7	291.1	2.92	1	1901.4	289.5	2.79
	AC=Ma 7			7.5, 12	1907.2	45.2	5.19	2	1843.6	58.3	8.69
* 9,124	Σ 2482	19 9 44	+19 0	8.5, 9.8	1910.7	344.5	1.93	8	1830.4	350.8	2.02
9,126	A. 153	19 9 55	+21 46	8.0, 11.2	1909.6	283.4	0.94	1	1900.6	282.3	0.81
9,127	Ho. 573	19 9 59	+19 25	9, 9.5	1906.7	125.7	7.10	1	1897.0	124.7	7.03
9,130	Hu. 335	19 10 17	+20 4	7.3, 11.0	1909.6	214.5	0.34	1	1901.6	222.3	0.49
9,131	Ho. 101	19 10 21	+30 53	9.3, 10.0	1904.5	105.8	1.95	1	1881.9	113.0	1.89
9,152	β 975	19 11 43	+34 26	9.4, 9.4	1913.9	225.6	0.55	1	1880.6	221.8	0.77
* 9,155	Σ 2488	19 12 12	+19 54	8.5, 9.7	1897.9 1902.9	328.4 328.7	1.54 1.55	7 9	1829.0	318.5	1.29
9,157	OΣ 368	19 12 39	+16 2	7.3, 8.5	1898.6 1902.4 12.2	212.6 216.6 214.6	0.86 0.87 0.89	9 14 9	1850.4	217.5	0.81
	AB, C				1899.6	101.7	17.72	1	1878.6	98.2	17.37
9,167	OΣ 371	19 12 56	+27 20	6.8, 6.9	1897.9 1902.7 10.5	156.4 154.7 154.2	0.77 0.81 0.82	9 18 9	1846.5	154.1	0.81
* 9,172	Ho. 447	19 13 10	+27 48	9.5, 9.5	1908.3	174.6	2.03	8	1893.8	181.0	1.14
* 9,173	Σ 2491	19 13 13	+28 9	7.9, 9.2	1899.7 1910.7	217.6 217.8	0.90 1.11	2 12	1828.8	206.6	1.09
9,176	A. 156	19 13 31	+24 9	7.9, 8.1	1914.2	78.2	0.36	7	1900.6	80.1	0.42
9,180	Hu. 336	19 13 56	+18 45	8.9, 9.2	1909.4 12.9	196.5 193.2	1.38 1.37	5 8	1901.6	199.8	1.49
9,177	Σ 2490	19 14 4	- 3 36	8.5, 10.7	1899.8	243.3	3.03	1	1828.1	249.2	3.24
9,194	β 248	19 14 33	+22 54	5.7, 9.5	1912.9	127.4	1.71	12	1876.1	125.0	1.86
9,189	Σ 2492	19 14 43	+ 0 57	5.5, 9.5	1908.7	11.6	3.32	1	1830.2	11.1	3.38
9,192	β 1256	19 14 48	+ 6 12	8.3, 8.3	1899.8 1902.2 09.7	33.9 38.0 35.7	0.62 0.69 0.58	7 6 1	1891.6	37.1	0.64
9,191	Ho. 103	19 14 55	- 3 35	9.2, 9.2	1907.6	246.6	2.45	1	1885.2	248.4	2.59
9,222	Σ 2502	19 16 25	+39 8	8.2, 10.2	1905.7	206.2	1.70	1	1831.1	205.8	1.83
9,219	Howe 47	19 16 53	+ 2 48	8.2, 8.3	1900.0	151.1	0.40	6	1890.6	154.0	0.39
9,221	Ho. 576	19 16 58	+ 6 30	7.0, 10.7	1905.6	181.5	3.88	3	1894.7	180.9	3.56
	AC			10.0	1906.7	253.5	42.24	1			

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,230	Σ 2505	h m s	° ' "	8.0, 8.7	1907.7	315.0	10.51	3	1831.8	314.9	9.93
9,253	β 141	19 17 10	+35 24	7.5, 9.1	1900.9	83.5	0.77	7	1876.0	80.6	0.71
	CD	19 18 45	+22 22	11.5, 12.7	12.0	85.8	0.77	3			
					1897.8	182.4	5.57	2	1898.6	177.2	4.90
					1908.7	180.2	5.47	1			
9,252	Ho. 105	19 18 51	+16 31	8.5, 10.0	1907.1	187.5	2.60	6	1883.7	188.4	2.59
9,262	Σ 2510	19 19 43	+ 9 22	8.5, 8.5	1913.7	182.6	8.70	1	1829.1	181.7	8.75
9,276	β 1129	19 19 56	+52 14	6.3, 6.3	1901.3	335.4	0.29	4	1889.5	344.3	0.34
					13.5	331.0	0.34	5			
9,284	Espin 80	19 21 14	+33 0	8.6, 9.0	1911.1	189.1	3.64	8	1901	187.1	3.8
* 9,279	Σ 2513	19 21 24	+ 2 18	8.2, 8.8	1912.4	318.1	1.99	5	1829.1	313.0	2.23
9,288	Ho. 448	19 21 36	+23 28	8, 11	1907.1	0.3	7.54	5	1891.0	358.9	7.66
9,289	Hu. 339	19 21 44	+18 30	8.6, 8.6	1908.0	46.1	0.52	10	1901.5	44.5	0.53
9,301	OΣ 373	19 21 53	+46 17	7.3, 10.2	1908.8	232.3	1.65	3	1847.4	232.4	1.84
9,292	Σ 3111	19 21 53	+21 41	9.0, 9.3	1910.8	117.0	2.34	8	1832.5	120.1	2.54
	† Bowyer	19 22 20	+18 32	9.5, 10.5	1907.3	303.2	7.06	4			
* 9,298	Σ 2518	19 22 22	+14 27	8.0, 10.9	1914.4	355.7	5.34	5	1829.9	0.7	4.97
9,305	Σ 2522	19 22 48	+28 36	7.5, 9.0	1908.8	337.0	4.27	1	1830.4	339.2	4.39
	‡ Bowyer	19 23 5	+18 29	9.0, 9.0	1907.3	251.0	9.24	4			
9,307	Σ 2520	19 23 20	+12 43	8.8, 9.3	1913.0	233.2	1.74	11	1829.4	234.9	2.02
* 9,319	Σ 2525	19 23 29	+27 10	7.4, 7.6	1896.3	327.6	0.46	6	1830.4	255.9	1.33
					98.1	321.3	0.43	9			
					99.9	319.3	0.45	9			
					1902.4	314.3	0.50	10			
					05.3	311.9	0.61	8			
					08.6	307.7	0.68	13			
					11.5	305.4	0.71	12			
					14.3	305.7	0.84	11			
					19.6	302.1	0.89	1			
9,320	Ho. 449	19 23 30	+27 13	9.0, 12.3	1908.8	178.3	13.60	1	1892.6	183.7	12.54
9,324	Ho. 450	19 23 30	+38 39	8.0, 8.7	1911.0	271.3	0.90	9	1892.1	271.8	0.76
	AC			12.2	1907.9	73.2	30.69	1	1892.6	73.0	29.58
* 9,318	Σ 2524	19 23 31	+25 20	8.3, 8.5	1909.3	95.3	6.47	8	1829.8	104.6	7.16
					13.3	96.9	6.64	14			
* 9,325	Ho. 451	19 23 49	+27 43	9.3, 11.0	1907.7	295.8	4.18	6	1892.6	301.1	3.65
9,327	A. 159	19 24 5	+20 31	8.4, 11.7	1908.8	333.5	0.90	2	1900.7	335.0	0.78
	AC=Σ 2527			8.2, 9.7	1910.1	19.8	4.17	5	1830.1	20.5	4.32
9,341	β 424	19 24 42	+35 54	8.7, 10.1	1913.0	39.1	2.92	5	1877.1	38.0	2.76

† B.D. + 18°4067 ?

‡ B.D. + 18°4074 ?

β .G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,337	Σ 3132	h m s 19 24 55	° ' " +20 3	8.8, 10.3	1905.6	° 42.9	" 7.37	2	1830.3	° 40.0	" 7.46
9,340	Hu. 340	19 25 2	+18 19	9.0, 9.3	1908.1	121.3	0.87	8	1901.5	124.8	0.84
9,343	Σ 2530	19 25 6	+20 10	8.6, 9.9	1905.6	155.1	5.56	2	1829.7	157.7	5.43
13,468	Hu. 1194	19 25 24	+35 11	9.0, 9.2	1913.9	41.0	0.76	1	1904.8	39.1	0.96
9,351	A. 160	19 25 40	+22 55	8.5, 8.6	1912.9	52.0	0.39	12	1900.6	52.4	0.47
9,353	A.G. 231	19 25 57	+17 48	9.2, 9.5	1907.0	239.2	4.22	4	1901.6	239.8	4.41
9,371	A. 269	19 27 30	+27 5	8.8, 9.5	1908.8	169.3	0.59	2	1901.8	180.7	0.60
9,372	β 651	19 27 32	+28 8	8.5, 12.5	1908.8	287.1	6.44	2	1878.5	291.5	6.36
9,374	Σ 43, App. I.	19 27 41	+27 48	3.0, 5.3	1900.7	54.9	34.41	4	1832.2	55.7	34.29
9,387	β 143	19 27 52	+49 21	8.0, 9.1	1911.1	191.6	2.11	6	1875.6	192.7	2.20
9,376	Ho. 452	19 28 3	+13 0	8.5, 11.7	1906.7	246.6	7.15	2	1891.6	245.4	6.07
	AC			12.7	1906.7	183.5	20.09	1	1891.6	179.5	19.36
* 9,381	Σ 2536	19 28 17	+17 38	8.0, 11.0	1897.6 1909.1	73.3 77.6	1.82 1.74	7 5	1831.2	35.5	1.95
9,391	β 438 AB	19 28 40	+36 33	7.9, 13	1899.8	37.0	4.59	1	1879.5	40.9	4.37
	AC			13	1899.8	235.3	21.74	1	1878.5	238.5	21.09
	DE			8.3, 8.7	1899.8	53.9	5.92	1	1830.9	52.5	6.08
9,394	β 652	19 29 4	+28 7	7.9, 13	1896.5	324.4	4.77	1	1879.0	328.6	4.33
	AC= Σ 2539			9.7	1897.9	1.5	5.56	5	1830.7	5.2	5.36
13,476	A. 713	19 29 6	+47 19	6.9, 7.3	1911.8	215.8	0.28	1	1904.6	210.8	0.27
9,401	Σ 2540	19 30 1	+20 15	7.5, 9.0	1913.0	146.7	5.00	11	1830.8	149.7	5.13
9,409	Ho. 108	19 30 30	+33 19	8, 8	1907.9	47.9	0.44	1	1885.2	45.9	0.43
13,481	Hu. 949	19 30 38	+32 55	8.6, 9.0	1907.9	103.0	0.59	1	1904.5	103.3	0.70
* 9,415	O Σ 375	19 31 16	+17 58	7.2, 8.4	1898.4 1903.0 12.8	142.9 149.2 151.0	0.48 0.57 0.61	6 12 16	1847.3	138.3	0.59
9,419	Ho. 274	19 31 32	+16 17	8.3, 11.0	1907.1	73.4	3.88	5	1887.7	72.4	4.07
9,424	β 53	19 31 55	+11 17	9.5, 10.2	1910.4	246.7	1.44	3	1875.1	246.8	1.40
9,437	A. 368	19 32 3	+29 37	8.5, 8.8	1910.8	154.8	0.52	3	1902.6	158.6	0.49
* 9,456	Σ 2553	19 32 24	+61 53	8.4, 9.2	1899.5	97.4	0.94	1	1832.7	80.2	1.06
9,449	A.G. 234	19 32 56	+36 7	9.3, 9.4	1910.8	326.6	2.55	4	1902.6	329.9	2.58
* 9,450	Σ 2544	19 33 30	+ 8 9	7.8, 9.5	1901.4	207.5	0.96	6	1829.0	218.4	1.14
	AC			8.5	1902.9	239.4	15.64	4	1829.0	239.2	16.12
* 9,459	O Σ 377	19 33 32	+35 29	8.4, 8.5	1908.8	38.1	0.86	2	1842.7	51.2	0.88

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,478	A. 164	h m s	° ′			°	"			°	"
9,478	A. 164	19 34 40	+22 39	7.5, 9.0	1909.7	218.8	0.59	1	1900.6	210.2	0.38
9,491	Ho. 110	19 35 35	+18 31	9.5, 9.5	1907.8 10.8	79.3 78.4	2.58 2.45	8 7	1886.2	76.8	2.04
13,490	Hu. 953	19 36 9	+35 4	8.6, 9.0	1907.8	177.0	1.08	2	1904.5	177.3	1.04
* 9,500	Σ 2556	19 36 13	+22 5	7.3, 7.8	1898.6 1912.1	144.6 131.1	0.44 0.38	13 18	1829.8	188.4	0.56
9,510	A. 166	19 37 0	+23 20	9.0, 9.1	1913.3	236.7	0.62	2	1900.6	235.4	0.67
9,523	Ho. 112	19 38 9	+18 27	9, 9	1907.1	79.8	2.69	6	1885.6	80.8	2.64
9,524	β 145	19 38 17	+30 32	6.8, 9.5	1908.8	266.7	0.83	3	1875.1	268.2	0.87
	AC			13.0	1908.8	28.9	8.90	2	1878.4	32.6	8.51
9,535	OΣ 382	19 38 50	+27 12	7.1, 7.6	1910.9	349.4	0.38	5	1849.8	353.7	0.48
9,527	Howe 50	19 38 52	+4 46	8.5, 9.0	1910.7	14.7	2.40	1	1879.6	15.9	2.54
9,531	OΣ 380	19 39 2	+11 39	6.0, 7.2	1911.5	75.5	0.45	15	1850.7	74.8	0.62
* 9,570	Σ 2574	19 39 39	+62 29	8.0, 8.0	1899.5 1913.5	156.6 165.1	0.43 0.27	1 1	1832.2	129.4	0.96
9,552	β 1132	19 40 2	+26 45	8.3, 8.7	1899.6	223.3	0.48	11	1889.6	227.3	0.49
13,493	Hu. 1195	19 40 4	+13 30	8.7, 14.5	1906.7	322.5	2.42	1	1905.3	319.8	2.02
* 9,565	OΣ 383	19 40 24	+40 32	7.0, 8.5	1908.8	21.5	1.13	2	1845.1	27.4	0.91
9,562	β 657	19 40 36	+22 27	9.2, 10.0	1909.7	147.3	0.94	2	1877.7	140.1	0.93
9,569	β 658	19 40 52	+26 57	6.5, 10.0	1898.9 1903.9	289.2 293.1	0.51 0.47	8 5	1878.5	295.2	0.57
9,582	OΣ 384	19 41 7	+38 8	7.0, 7.3	1908.8	192.4	1.10	3	1851.7	195.9	0.99
9,549	† Lewis 30	19 41 17	+26 49	9.0, 9.5	1899.6 1910.6	345.2 348.0	3.41 3.39	2 2			
9,574	A. G. Clark 10	19 41 23	+10 35	7.5, 7.5	1913.8	134.3	0.23	1	1878.4	145.5	0.29
9,577	Σ 2569	19 41 24	+16 38	8.0, 8.5	1911.0	1.7	2.19	4	1830.5	2.3	2.35
9,635	Σ 2592	19 41 40	+76 23	8.0, 9.9	1899.5	295.9	1.22	1	1832.7	304.6	1.39
9,586	Σ 2577	19 41 55	+20 44	8.1, 9.5	1912.9	263.0	5.93	5	1832.5	263.4	5.64
9,601	Dawes 13	19 42 22	+44 44	7.5, 11.3	1910.8	268.4	1.94	3	1859.9	266.2	2.32
9,595	A.G. 237	19 42 23	+30 37	8.6, 9.2	1909.8	144.9	2.17	2	1903.5	145.0	2.19
* 9,605	Σ 2579	19 42 38	+44 56	3.0, 7.9	1899.5 1914.0	303.8 281.0	1.37 1.56	5 4	1830.2	37.9	1.78
* 9,602	Σ 2576	19 42 42	+33 26	7.8, 7.8	1909.3 12.8	287.3 285.2	2.34 2.05	7 8	1831.8	318.8	3.60
9,627	Hu. 758	19 44 12	+33 10	9.0, 9.0	1909.4	144.6	0.90	3	1904.4	147.9	0.99
9,621	Hu. 346	19 44 13	+16 56	8.8, 9.5	1906.7	184.4	0.52	1	1901.6	182.8	0.57

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,630	Dawes 10	h m s	° ' "	8.0, 9.0	1910.8	298.8	0.53	1	1859.6	314.3	0.5±
9,632	Doo. 11	19 44 53	+24 36	9.0, 10.0	1910.8	280.3	2.50	1	1900.7	279.8	2.64
9,637	Σ 2584	19 45 8	+22 1	8.5, 8.5	1907.7	294.8	1.93	2	1830.1	299.2	1.95
* 9,634	Σ 2583	19 45 10	+11 38	6.0, 6.8	1907.8 13.1	115.7 114.3	1.48 1.37	4 10	1830.0	120.7	1.50
9,641	Σ 2586	19 45 25	+24 47	7.3, 10.2	1907.7	224.9	3.79	2	1830.2	227.4	3.61
9,644	OΣ 386	19 45 33	+36 59	7.7, 8.0	1908.7	76.4	1.01	1	1846.6	77.5	0.97
* 9,643	A. G. Clark 11	19 45 39	+18 58	5.5, 6.5	1896.36 99.13 1901.40 04.74 07.70 08.74 13.69 15.65	169.1 163.2 155.0 150.8 140.4 113.8 171.7 163.4	0.22 0.34 0.19 0.18 0.19 0.18 0.21 0.18	3 8 7 4 3 4 4 1	1878.11	157.6	0.29
	AC=Σ 2585			5.7, 8.7	1898.5 1905.5	310.2 310.5	8.65 8.64	6 8	1831.1	312.8	8.49
* 9,650	OΣ 387	19 45 55	+35 7	7.2, 8.2	1898.7 1903.9 09.7 13.4	343.0 328.6 324.4 316.7	0.50 0.54 0.53 0.52	9 5 6 10	1844.2	129.4	0.50
9,660	Σ 2588= A. 718 A, BC	19 46 37	+44 12	7.9, 8.3	1911.8	157.1	9.60	1	1833.2	160.5	9.59
9,659	β 361	19 47 3	+22 29	9.2, 9.9	1909.7	350.4	3.51	3	1875.9	350.0	3.49
9,664	Σ 2587	19 47 43	+ 3 54	6.5, 9.2	1903.7	102.3	4.02	6	1828.1.	98.6	4.08
9,678	β 978	19 48 17	+23 20	8.3, 8.4	1911.4	236.0	0.94	10	1880.5	234.2	0.94
9,682	Σ 2590	19 48 41	+10 10	7.1, 10.0	1902.7	308.6	13.42	1	1830.5	309.2	13.51
* 9,686	β 979	19 48 52	+23 5	8.3, 11.1	1909.8	329.4	2.03	1	1880.5	338.7	2.24
9,693	OΣ 388	19 49 12	+25 40	7.6, 7.6	1911.1	139.3	3.45	6	1848.5	140.5	3.70
	AC			8.8	1908.7	135.7	30.95	2			
9,695	Ho. 580	19 49 15	+22 16	8.0, 8.1	1901.1 05.4	273.0 274.3	0.68 0.74	9 7	1895.8	267.6	0.65
9,714	A.G. 242	19 50 15	+36 52	9.2, 9.7	1908.8	180.2	1.82	3	1902.6	178.5	1.85
9,711	Σ 2599	19 50 25	+22 48	7.8, 9.5	1905.5	52.2	4.03	2	1829.8	48.6	3.91
* 9,712	Σ 2596	19 50 36	+15 6	7.2, 8.6	1911.2	324.5	1.93	20	1831.3	353.0	2.12
* 9,719	Σ 2597	19 51 18	- 6 56	6.9, 8.0	1900.9	85.7	1.41	4	1826.5	92.1	1.92
9,725	Ho. 115	19 51 30	+17 3	8.1, 13	1907.4	327.6	6.00	3	1886.7	326.0	4.96
* 9,724	OΣ 532	19 51 38	+ 6 13	3.4, 11.3	1901.3	12.4	12.29	2	1852.4	17.1	12.36
	† Lewis	19 52 0	+22 20	10, 10	1907.6	80.0	2.85	3			

† Not identified.

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,729	Σ 2600	h m s 19 52 1	° ' " +22 18	8.3, 9.7	1901.7 06.3	° ' " 57.0 56.8	" ' " 2.95 3.16	10 10	1829.8	° ' " 54.6	" ' " 3.15
* 9,739	Ho. 581	19 52 27	+41 39	7.5, 7.5	1911.78	122.1	0.28	1	1895.69	258.4	0.32
9,736	Ho. 116	19 52 39	+17 43	8.0, 12.7	1907.4	23.5	4.62	3	1886.7	22.2	3.90
9,753	β 831	19 53 20	+47 11	8.6, 9.0	1913.9	129.6	0.72	1	1881.5	128.0	0.94
9,752	β 980	19 53 29	+34 53	5, 13.0	1899.7	214.5	7.54	1	1879.9	209.6	7.07
	† Bowyer	19 53 44	+21 53	8.5, 11	1906.7	128.0	1.84	3			
9,759	β 425	19 54 14	+20 5	8.8, 9.0	1898.4 1907.1	241.5 240.6	1.32 1.40	15 13	1876.3	241.3	1.26
	AC			12.0	1900.8	41.8	20.22	1	1879.6	40.4	19.81
9,767	β 981	19 54 39	+20 20	8.0, 11.4	1910.7	115.1	3.10	1	1880.3	111.4	3.07
9,771	A. Clark 16	19 54 48	+27 3	7.5, 8	1898.9 1902.0 06.5	55.4 57.8 54.9	0.43 0.38 0.42	8 9 9	1859.6	234.3	0.35±
9,772	A.G. 244	19 55 2	+21 56	9.0, 10.4	1906.5	276.9	1.42	13	1902.7	275.6	1.16
	AC			10.5	1906.4	246.1	13.37	8			
	‡ Lewis	19 55 19	+21 50	9.0, 10.0	1906.5	298.4	2.19	7			
9,779	Ho. 582 AB, C	19 55 24	+33 20	8.5, 12	1904.5	182.5	7.38	1	1895.7	187.4	7.24
* 9,782	OΣ 392	19 55 25	+42 3	7.2, 9.0	1900.9 11.8	300.6 283.1	0.34 0.32	4 3	1844.7	322.0	0.44
	AC=Σ 2607			9.0	1900.5 11.8	290.7 291.4	3.12 3.07	5 3	1831.5	293.4	3.23
* 9,783	Σ 2606	19 55 38	+33 4	7.5, 8.2	1904.7	136.9	1.12	1	1832.1	131.0	1.19
9,780	Ho. 583	19 55 49	+21 54	9.0, 10.7	1905.9	257.0	1.58	5	1895.8	250.0	1.21
9,801	β 1133	19 56 42	+31 37	6.8, 9.5	1899.1 1909.8	338.7 336.0	0.79 0.88	5 1	1889.6	338.6	0.87
9,809	Ho. 584	19 57 7	+25 59	6.5, 12	1906.7	228.7	2.05	1	1896.7	226.4	2.29
9,811	β 1258	19 57 14	+29 42	8.0, 12.0	1901.3	156.4	1.37	9	1878.4	159.9	1.52
9,823	β 439	19 57 45	+29 37	7.9, 12.7	1902.7	238.5	3.25	5	1876.8	249.7	2.70
9,824	§ Lewis 32	19 57 49	+30 0	9.0, 9.5	1901.0	129.9	3.50	3			
9,818	Σ 2613	19 57 51	+10 32	7.0, 7.2	1904.8	349.0	4.44	1	1829.2	350.7	4.69
* 9,833	OΣ 395	19 58 50	+24 43	5.8, 6.2	1897.3 1903.3 13.6	101.7 101.9 104.3	0.61 0.60 0.65	9 21 19	1844.2	79.3	0.64
9,838	Ho. 586	19 58 59	+32 50	9, 12	1908.1	176.3	6.78	3	1895.6	174.5	6.07
* 9,834	Σ 2615	19 59 15	+ 8 11	7.2, 10.1	1904.9	315.0	10.12	1	1828.9	323.2	10.82

† B.D. + 21° 3983 ?

‡ B.D. + 21° 3996 ?

§ B.D. + 29° 3847.

β .G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,837	Σ 2616	h m s 19 59 18	° ' " +14 22	6.8, 9.7	1902.6 06.7	° " 265.5 263.0	" " 3.47 3.51	7 5	1829.7	° " 265.9	" " 3.27
9,853	Ho. 117	19 59 40	+33 28	9.1, 10.4	1907.4	312.1	4.72	3	1883.5	313.5	5.08
9,856	Ho. 118	19 59 51	+33 27	9.1, 11.0	1907.4	24.0	2.73	3	1883.5	27.1	2.85
9,852	Σ 2618	20 0 0	+15 15	8.6, 8.9	1905.3	115.3	5.40	3	1831.3	115.5	5.29
13,501	A. 1194	20 0 27	+12 8	8.9, 9.0	1910.6	303.2	0.75	11	1905.6	308.0	0.78
9,862	Σ 2620	20 0 37	+11 35	8.2, 9.3	1899.7 1903.7	285.2 289.4	1.60 1.87	3 9	1830.8	291.9	1.78
9,866	A. 380	20 0 39	+32 7	9.3, 9.4	1911.8	202.2	1.02	2	1902.7	201.4	0.89
9,868	Σ 2624	20 0 41	+35 49	7.2, 7.8	1902.3	174.6	1.83	6	1830.8	178.8	2.04
	AC			9.5	1899.8	328.2	42.50	1	1831.8	327.4	42.35
	AD			11.5	1899.8	172.1	29.02	1			
9,863	Σ 2622	20 0 44	+16 47	8.0, 8.7	1905.2	194.0	5.89	2	1831.4	194.2	5.97
	AC			9.5	1905.2	308.3	17.11	2			
9,865	Σ 2621	20 0 58	+ 9 2	7.7, 7.9	1904.8	223.4	5.89	2	1829.7	222.0	5.67
9,877	Σ 2626	20 1 15	+30 20	8.0, 8.2	1905.4	123.8	1.26	3	1831.1	121.7	1.17
9,884	β 57	20 1 59	+15 17	6.2, 10.6	1904.5	119.2	2.24	4	1875.1	118.9	2.33
13,504	A. 1197	20 2 49	+29 33	9.0, 9.5	1909.3	338.0	0.32	3	1905.6	344.1	0.34
9,908	β 428	20 3 11	+12 44	7.2, 8.5	1910.8	352.4	0.69	8	1876.5	343.7	0.56
9,925	Σ 2631	20 3 55	+20 53	8.0, 9.4	1905.3	338.1	5.05	3	1830.8	342.1	4.45
* 9,921	Σ 2627	20 3 58	+ 4 34	9.0, 11.5	1904.9	30.5	1.95	1	1829.4	23.2	1.96
* 9,926	Σ 2628	20 4 13	+ 9 11	6.1, 8.2	1904.8	342.0	4.15	2	1830.6	348.9	4.48
* 9,944	Σ 2642	20 4 34	+63 29	8.7, 8.7	1899.5	172.7	2.16	1	1832.5	165.2	2.45
9,933	O Σ 398	20 4 34	+35 30	7.3, 9.8	1909.2	81.3	0.98	4	1846.4	84.6	0.90
9,936	Σ 2633	20 5 2	+32 22	8.0, 11.0	1905.3	103.7	12.03	2	1831.8	102.5	11.57
9,943	A. 382	20 5 28	+42 10	6.9, 10.3	1903.5	89.9	1.21	1	1902.8	85.1	1.29
9,949	Σ 2634	20 6 9	+16 35	8.0, 9.5	1905.2	11.8	5.74	2	1830.1	13.7	6.43
9,956	Σ 2639	20 6 24	+35 16	7.7, 8.7	1904.9	301.0	5.99	1	1830.3	303.5	5.52
9,950	Σ 2635	20 6 30	+ 8 14	7.0, 10.5	1904.9	80.1	7.62	1	1828.1	78.5	7.30
* 9,979	O Σ 400	20 7 45	+43 43	7.2, 8.2	1913.9	345.4	0.35	1	1845.7	334.9	0.64
* 9,994	Σ 2652	20 7 46	+61 51	7.3, 7.6	1899.5 1914.7	256.2 254.1	0.26 0.33	1 1	1832.6	280.3	0.32
13,512	A. 1200	20 8 22	+28 56	7.6, 13.8	1908.8	197.0	4.93	1	1905.5	196.9	4.86
9,987	β 430	20 8 30	+35 36	9.3, 10.2	1909.8	29.0	1.01	1	1877.3	18.7	1.10

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
9,989	β 982	h m s	° ′	8.8, 10.0	1909.6	°	"	2	1880.5	°	"
		20 8 44	+26 9			54.1	0.94			51.0	0.87
9,982	Σ 2644	20 8 46	+ 0 39	7.1, 7.4	1911.7	209.7	3.29	1	1830.8	207.6	3.34
9,990	Doo. 14	20 8 47	+25 40	9.2, 10.0	1909.8	262.5	1.98	3	1900.7	260.4	1.86
13,514	A. 1201	20 9 19	+28 54	9.0, 9.1	1909.2	171.5	0.33	2	1905.6	171.8	0.28
10,003	Doo. 15 BC	20 9 22	+25 25	9.0, 10.7	1908.9	173.4	2.39	1	1900.7	168.0	2.06
13,515	A. 1202	20 9 45	+10 33	8.9, 9.5	1910.0	120.0	0.68	3	1905.6	121.9	0.60
10,011	Σ 2651	20 10 18	+15 56	8.0, 8.0	1905.3	284.4	1.55	3	1830.1	279.9	1.59
*10,017	Σ 2653	20 10 27	+24 0	7.0, 10.1	1910.3	265.4	2.50	9	1831.5	255.4	2.45
10,022	Σ 2655	20 10 47	+22 0	7.5, 7.5	1905.3	3.3	6.16	3	1831.2	3.0	6.09
10,041	OΣ 403	20 11 46	+41 52	7.0, 7.2	1913.4	171.1	0.76	3	1848.1	173.0	0.60
	AB, C=Σ 2657 R.			9.5	1912.8	35.1	10.63	2	1848.1	33.2	11.83
10,037	Ho. 122	20 11 47	+28 26	9.0, 9.7	1907.8	75.4	1.10	1	1886.2	72.5	1.07
10,045	Espin 27	20 11 57	+46 38	9.4, 9.5	1912.8	338.8	3.77	2	1899.6	338.0	3.86
10,040	β 983	20 12 5	+25 22	6.1, 10.2	1910.0	153.7	0.89	5	1879.9	154.9	0.86
10,064	Ho. 588 BC.	20 13 54	+31 16	8.3, 12	1907.9	15.9	8.61	1	1896.1	15.0	8.19
	AB			6.5, 8.3	1907.9	297.8	50.97	2	1896.2	298.7	51.03
10,071	Σ 2663	20 14 7	+39 28	8.0, 8.5	1904.9	323.9	5.38	1	1831.2	324.9	5.27
10,073	Ho. 591	20 14 25	+27 39	9.5, 10	1907.4	293.4	2.25	3	1897.7	296.7	1.96
*10,072	β 984	20 14 25	+26 8	7.9, 8.2	1909.9	213.2	0.79	10	1880.5	204.1	0.86
					13.9	215.4	0.76	11			
10,076	β 441	20 14 27	+28 54	7.0, 11.5	1909.0	65.7	5.70	4	1876.8	65.4	5.87
10,075	Hu. 585	20 14 34	+50 54	8.8, 10.0	1903.5	52.4	4.22	1	1902.5	49.8	4.81
10,081	Σ 2662	20 14 59	+10 45	8.2, 11.0	1905.7	43.0	1.92	3	1831.0	38.9	1.72
13,519	A. 1205	20 15 9	+28 59	8.9, 9.7	1909.2	346.8	0.38	2	1905.8	345.6	0.34
10,100	Σ 2666	20 15 28	+40 29	6.5, 8.7	1905.3	244.1	2.51	2	1831.2	242.0	2.73
10,103	OΣ 405	20 15 46	+33 1	7.7, 8.7	1908.8	147.6	0.70	2	1846.4	152.6	0.61
10,099	Σ 2665	20 15 52	+14 8	6.5, 9.2	1905.2	19.0	3.47	2	1829.8	17.2	3.14
10,107	A. 391	20 15 59	+24 26	9.0, 10.7	1911.7	282.3	0.90	2	1902.8	274.6	0.76
10,102	Σ 2664	20 16 7	+12 46	7.7, 8.2	1905.3	321.9	27.96	2	1829.1	322.5	27.69
10,115	β 1206	20 16 17	+36 31	7.8, 10.8	1897.7	359.7	1.80	1	1890.5	3.0	1.90
13,521	A. 1207	20 16 30	+29 41	9.5, 10.2	1908.8	357.6	0.54	1	1905.8	356.2	0.44
10,121	Ho. 126	20 16 32	+38 44	9.7, 9.7	1907.9	152.3	2.86	1	1886.8	146.7	2.89
10,134	β 431	20 17 7	+36 1	8.5, 8.8	1909.8	34.3	0.57	5	1877.3	40.8	0.56
					14.1	37.4	0.54	6			

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
10,138	Ho. 593	h m s 20 17 17	° ' " +39 23	8.7, 10.5	1907.9	314.9	4.67	1	1895.7	313.8	4.68
10,140	Σ 2668	20 17 32	+39 10	7.0, 9.2	1904.9	288.2	3.30	1	1831.1	293.6	3.30
10,148	β 1259	20 18 16	+30 21	8.3, 8.7	1902.7	166.8	0.44	9	1891.7	171.9	0.47
*10,147	Σ 2672	20 18 22	+23 31	8.7, 8.8	1907.5 11.8	294.6 297.5	0.90 0.86	6 8	1831.8	278.4	1.07
*10,160	Σ 2673	20 19 13	+13 5	8.0, 9.5	1905.6	329.9	2.39	2	1830.7	335.1	2.53
10,161	CD= Σ 2674			8.0, 10.7	1905.6	0.4	15.49	2	1829.6	1.3	15.51
10,166	Σ 2676	20 19 42	+26 54	7.8, 10.0	1905.6	169.2	2.35	2	1831.5	173.8	2.19
10,180	Ho. 128	20 20 19	+42 45	6.3, 11.0	1900.7	26.0	1.02	1	1886.9	34.6	0.95
13,527	Hu. 1198	20 20 51	+12 46	8.4, 9.2	1907.8	32.8	0.55	1	1905.4	32.9	0.59
10,192	Ho. 457	20 21 16	+29 9	8.2, 8.2	1906.5	60.5	2.10	7	1889.8	63.4	1.62
10,189	Σ 2680	20 21 20	+14 37	8.3, 8.5	1905.3	288.7	16.48	2	1829.4	289.0	15.84
10,203	β 432	20 21 56	+35 32	8.6, 9.9	1901.9	193.1	1.23	6	1877.2	195.2	1.24
*10,213	Δ 22	20 22 47	+39 51	7.9, 9.0	1910.8	144.9	2.74	6	1875.1	139.7	2.76
*10,220	Ho. 130	20 23 23	+36 57	8.5, 8.7	1906.7	286.3	2.51	1	1883.7	285.4	1.43
10,225	A. 393	20 23 39	+27 49	8.7, 9.2	1911.2	213.2	0.35	4	1902.9	210.4	0.37
10,240	Ho. 131	20 24 51	+18 32	7.8, 11.2	1907.2	325.7	4.68	4	1881.6	322.8	4.54
10,247	β 62	20 24 56	+29 53	8.5, 9.4	1913.3	134.2	1.12	9	1875.5	135.5	1.20
10,258	Σ 2686	20 26 8	+10 3	8.3, 9.8	1905.8	279.1	27.18	1	1825.8	279.3	27.71
10,279	Σ 2691	20 26 54	+37 52	8.0, 8.2	1905.3	32.6	17.37	2	1831.6	32.8	17.08
*10,275	Σ 2688	20 27 17	+13 32	8.7, 9.8	1905.7	174.4	6.68	2	1830.0	172.8	5.56
*10,281	Dawes 1 AB= Σ 2690 AD	20 27 37	+11 0	7.0, 7.2	1908.8	256.7	15.76	3	1831.3	256.3	14.19
	BC= $O\Sigma$ 407			12	1908.8	106.9	23.48	1	1878.3	108.4	23.40
				7.5, 7.6	1908.6	219.9	0.43	7	1847.0	212.3	0.57
10,290	Σ 2692	20 27 50	+26 14	8.0, 9.0	1905.8	301.1	25.74	1	1831.3	302.0	25.67
10,295	Ho. 133	20 28 16	+13 48	8.0, 8.0	1907.8	184.3	0.87	1	1885.2	182.1	0.83
10,305	Σ 2695	20 28 45	+25 33	6.2, 8.0	1897.9 1902.7 10.4 13.6	77.8 79.5 79.3 79.0	1.02 1.13 1.07 1.03	14 17 12 10	1831.8	76.5	0.80
10,307	† Lewis 35	20 29 21	+13 42	9.0, 9.5	1902.5 11.7	139.1 115.9	0.43 0.39	6 3			
*10,310	β 670	20 29 23	+13 41	8.5, 8.8	1903.0 11.7	38.7 37.6	0.52 0.42	9 4	1877.8	58.3	0.76
*10,314	Σ 2696	20 29 48	+ 5 11	8.0, 8.4	1905.7	300.6	0.64	3	1831.1	298.9	1.06

† Precedes β 670 (B.D. + 13.4435) by 2" in R.A. and + 75" in Dec. (See Leipzig I., No. 7987.)

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
10,327	Σ 2698	h m s 20 30 36	° ' " +27 53	8.1, 9.0	1912.6	302.9	4.27	9	1831.3	305.5	4.11
10,338	OΣ 408	20 31 5	+34 25	7.2, 10.2	1909.9	190.9	1.48	1	1846.1	192.7	1.68
10,344	Σ 2700	20 31 43	+32 15	6.5, 8.3	1905.8	286.3	24.13	1	1831.9	286.2	23.97
10,357	Σ 2702=Ho. 134	20 32 39	+34 54	8.5, 8.7	1906.6	204.0	3.37	4	1831.1	205.8	3.33
10,355	A.G. 258	20 33 1	+10 11	9.2, 9.4	1910.6	10.1	3.95	6	1894.8	10.5	4.50
10,361	Σ 2703	20 33 19	+14 28	7.6, 7.6	1905.7	291.1	25.38	2	1829.5	291.2	25.09
10,362	Σ 2701	20 33 23	+11 47	7.8, 8.2	1905.6	219.1	2.37	2	1829.8	218.8	2.13
*10,363	β 151	20 34 1	+14 20	4.1, 5.4	1895.73 99.58 1900.64 01.66 02.73 03.82 04.75 05.76 06.79 07.73 08.74 09.74 10.64 11.74 12.73 13.70 14.70 15.74	350.8 5.9 9.4 15.8 19.9 31.2 39.6 51.3 100.3 125.5 138.6 176.8 189.0 202.5 237.3 252.5 280.9 306.2	0.66 0.49 0.64 0.46 0.38 0.33 0.25 0.25 0.15 0.25 0.21 0.20 0.25 0.21 0.21 0.17 0.24 0.16	3 10 2 13 6 5 6 2 2 4 4 3 1 3 7 7 5 2	1874.66	15.5	0.65
	AB, C			12.7	1907.3	120.0	24.63	4	1878.1	116.2	27.66
	A, C				1899.9	118.2	25.66	5			
	AB, D=Σ 2704			3.0, 11.0	1899.0 1908.8	331.6 329.7	37.26 37.69	4 3	1829.4	343.8	32.48
10,376	A. 742	20 34 44	+29 27	9.5, 10.0	1910.8	132.0	1.05	2	1904.5	128.9	1.05
10,378	Σ 2705	20 34 44	+33 6	7.1, 8.1	1905.5	262.3	3.20	3	1831.9	262.1	3.05
10,382	A. 743	20 34 57	+29 42	9.0, 12.0	1909.9	306.2	0.96	1	1904.5	306.0	1.13
10,384	A. 744	20 35 1	+29 37	8.8, 8.8	1913.0	274.0	0.58	8	1904.5	269.1	0.55
10,388	A.G. 261	20 35 6	+30 52	9.0, 9.5	1911.2	154.2	4.11	3	1902.6	156.0	4.18
10,385	β 435	20 35 20	+14 44	8.1, 10.9	1912.7	114.9	2.94	9	1876.7	113.5	2.86
10,394	Ho. 458	20 35 22	+28 53	9.0, 9.1	1907.9	279.4	2.05	6	1893.8	278.5	1.85
*10,402	Σ 2708	20 35 48	+38 22	7.0, 8.7	1905.8	330.0	28.88	1	1832.6	351.7	11.25
10,415	Hu. 588	20 36 5	+50 7	9.0, 11.5	1903.5	244.3	1.86	1	1902.6	246.8	2.26
10,408	Ho. 136	20 36 11	+28 50	8.0, 11.5	1910.6	5.2	2.70	1	1882.7	6.2	2.51
*10,404	Σ 2709	20 36 14	+21 27	8.2, 10.0	1906.8	305.8	9.63	2	1830.8	314.7	9.21
10,414	Σ 2711	20 36 30	+30 14	8.0, 9.0	1905.7	223.4	2.28	3	1831.4	222.5	2.53
*10,423	OΣ 410	20 36 49	+40 18	6.4, 6.7	1913.0	13.7	0.66	7	1850.6	23.3	0.63

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
		h m s	° ' "			° ' "	"		°	"	
10,425	Σ 2714	20 37 9	+29 29	8.5, 12.0	1901.8	338.4	6.63	3	1831.8	336.2	6.82
10,422	Σ 2713	20 37 19	+10 19	9.0, 9.0	1905.7	64.2	5.24	2	1830.8	64.1	4.82
10,430	Ho. 137	20 37 29	+29 32	6.5, 11.0	1898.5 1907.2	281.7 287.8	1.05 0.84	6 3	1885.8	278.9	1.23
10,427	β 267	20 37 44	- 4 40	9.0, 9.0	1909.7	240.7	1.73	1	1878.7	242.4	2.11
10,437	Σ 2716	20 38 0	+32 3	6.0, 8.1	1910.2	49.1	2.60	7	1830.6	49.4	2.73
10,436	Σ 2715	20 38 11	+12 16	7.5, 10.1	1905.8	1.8	12.13	1	1830.6	2.3	11.96
10,447	Σ 2718	20 39 0	+12 28	7.4, 7.6	1905.3	87.7	8.63	2	1831.3	86.6	8.30
10,448	A.G. 262	20 39 19	+ 2 37	9.2, 9.3	1909.7	274.1	5.56	1	1903.4	273.7	4.74
*10,461	Σ 2720	20 40 1	+16 41	8.5, 8.7	1905.7	180.3	3.83	2	1830.4	185.0	3.81
10,465	Σ 2721	20 40 7	+19 37	8.0, 10.1	1905.7	29.8	2.51	2	1830.3	32.0	2.42
10,469	Ho. 138 CD	20 40 11	+25 20	10.9, 11.5	1908.3	339.9	2.91	2	1881.7	329.4	2.74
10,467	Σ 2722	20 40 12	+19 28	8.2, 8.7	1905.7	307.3	7.26	2	1830.4	308.0	7.09
10,485	Σ 2724	20 41 10	+23 40	8.2, 8.3	1905.7	326.7	2.50	2	1831.8	325.7	2.46
*10,483	Σ 2723	20 41 19	+12 3	6.4, 8.2	1907.0	103.7	1.34	7	1831.7	85.6	1.49
*10,487	β 64	20 41 26	+12 27	8.7, 9.0	1899.1 1911.6	184.7 192.3	0.49 0.28	9 1	1876.2	172.4	0.63
10,493	Hu. 690	20 41 31	+33 52	9.0, 9.2	1907.9	290.1	0.83	1	1903.2	282.5	0.59
10,501	A.G. 264	20 42 22	+24 26	9.0, 9.1	1909.5	356.4	1.91	11	1902.8	357.5	1.68
*10,506	Σ 2726	20 42 35	+30 27	4.0, 9.2	1905.7	60.7	6.43	3	1830.8	57.2	6.62
*10,504	Σ 2725	20 42 43	+15 38	7.3, 8.0	1906.0	3.6	5.28	4	1829.8	358.0	4.24
10,517	Ho. 141	20 43 41	+19 1	8.4, 10.8	1907.6	291.0	1.16	1	1881.9	289.4	1.15
*10,519	β 364	20 43 49	+25 8	8.7, 8.9	1910.7 13.7	227.2 226.6	1.28 1.18	9 7	1876.2	219.3	1.06
10,520	β 65	20 44 6	+ 5 44	5.2, 8.8	1910.7	187.7	1.05	2	1875.4	186.4	1.61
*10,533	$O\Sigma$ 413	20 44 29	+36 13	5.0, 6.3	1904.1 11.2 14.5	64.0 53.5 53.3	0.59 0.67 0.68	1 3 10	1842.7	122.3	0.65
10,528	A.G. 267	20 44 38	+ 4 10	9.0 9.2	1910.8	263.2	5.51	2	1903.1	261.4	5.15
10,538	β 66	20 44 54	+27 11	8.6, 9.1	1911.4	159.3	1.23	8	1876.0	158.9	1.23
10,547	Krueger 52	20 45 12	+55 50	9.0, 9.2	1911.7	68.5	4.54	1	1890.8	66.4	4.69
10,555	Σ 2731	20 46 12	+39 31	7.7, 10.8	1904.9	86.5	4.11	1	1830.8	86.1	3.96
	AC			13.0	1904.9	247.3	14.13	1			
	AD			12.5	1904.9	175.2	17.38	1			
10,557	β 366	20 46 14	+50 13	8.2, 8.5	1911.7	130.7	1.45	1	1876.4	128.5	1.40

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
10,562	Σ 2730	h m s	° ′			°	"			°	"
		20 47 21	+ 6 6	7.8, 7.9	1905.7	337.2	3.50	2	1830.3	339.2	3.43
*10,559	Σ 2729	20 47 27	- 5 54	5.9, 7.2	1895.81 98.75 1901.70 09.76 14.00	191.8 212.7 234.0 326.5 330.9	0.20 0.47 0.26 0.19 0.31	1 1 2 1 3	1829.76	24.5	0.74
10,566	β 67	20 47 29	+30 38	6.9, 10.2	1910.8	292.1	1.54	2	1875.5	287.1	1.51
10,571	A. 613	20 48 11	+ 5 28	8.7, 8.8	1910.8	6.7	0.62	2	1903.7	8.8	0.80
13,548	A. 1212	20 48 30	+ 9 57	8.6, 9.1	1910.8	23.1	0.51	2	1905.6	23.0	0.53
10,581	Ho. 144	20 48 58	+19 51	7.0, 7.0	1910.5	165.7	0.33	7	1886.8	167.9	0.42
*10,587	Ho. 145	20 49 11	+34 56	8.7, 10.2	1907.9	309.2	8.53	1	1886.3	319.5	7.80
10,591	OΣ 417	20 49 54	+28 52	7.5, 8.1	1911.6	28.7	0.63	11	1848.0	39.4	0.57
10,594	Ho. 597	20 50 15	+19 18	7.7, 12	1906.9	220.3	10.49	4	1895.8	220.9	9.62
*10,595	Σ 2734	20 50 29	+12 49	8.2, 8.7	1905.8	198.4	24.88	1	1829.8	181.7	28.50
10,598	Ho. 146	20 50 36	+34 56	8.0, 8.1	1907.9	51.9	0.46	1	1886.3	56.5	0.37
*10,608	OΣ 418	20 51 45	+32 25	7.3, 7.4	1911.3	290.3	1.13	12	1842.7	301.8	0.56
10,610	OΣ 419	20 51 46	+36 47	7.2, 10.5	1909.9	33.7	1.70	1	1847.1	40.0	1.78
*10,607	β 367	20 51 49	+27 48	7.5, 7.9	1900.0 10.8 14.2	131.8 162.5 179.4	0.43 0.23 0.19	7 2 5	1876.4	115.7	0.55
10,605	Σ 2735	20 51 55	+ 4 14	6.2, 7.7	1905.7	286.0	2.06	3	1829.5	289.7	2.13
*10,621	Ho. 460	20 52 50	+27 17	6.9, 12.6	1906.8	90.0	12.38	2	1892.8	83.9	12.83
10,623	Σ 2736	20 53 9	+12 42	7.5, 8.7	1905.7	216.4	5.72	1	1831.0	218.5	5.10
10,633	Barnard 13	20 54 29	+ 3 39	10.1, 11.3	1899.8	86.2	1.44	1	1891.8	84.7	1.42
10,640	Σ 2738	20 55 3	+16 8	7.2, 8.2	1905.7	254.9	14.77	2	1830.5	254.4	14.69
10,647	Hu. 363	20 55 17	+18 5	9.3, 9.3	1910.3	98.2	0.54	3	1901.6	94.3	0.60
*10,643	Σ 2737	20 55 20	+ 4 0	5.7, 6.2	1898.3 1902.6 11.0 13.3 15.8	284.0 282.5 276.1 279.9 229.9	0.74 0.66 0.34 0.28 0.21	7 9 4 5 1	1835.7	294.0	0.35
	AB, C			7.1	1898.0 1903.3 14.9	73.0 73.9 72.5	10.52 10.55 10.86	5 2 1	1833.4	78.1	10.85
10,650	OΣ 424	20 55 45	+15 16	7.5, 8.7	1899.7 1901.9 09.8	323.0 318.4 326.8	0.42 0.44 0.50	4 4 1	1846.2	328.7	0.46
	AC			10.0	1909.8	304.6	34.73	1	1891.8	306.2	34.17
10,655	Σ 2739	20 56 23	+19 46	8.3, 8.8	1904.6	253.3	3.04	4	1831.2	252.0	3.22
10,658	Hu. 764	20 56 23	+36 8	7.5, 8.7	1907.9	190.2	0.38	1	1904.5	187.5	0.33

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
10,666	A. 176	h m s	° ' "	9.2, 9.3	1911.6	134.0	0.32	1	1900.7	143.8	0.33
10,676	Σ 2742	20 57 25	+20 39	7.1, 7.1	1903.9	222.0	2.97	1	1831.6	224.7	2.58
*10,690	Σ 2746	20 58 30	+ 6 54	8.0, 8.6	1904.9	293.2	1.08	2	1830.8	276.2	0.87
10,689	β 69	20 58 56	+38 58	8.2, 9.0	1898.8 1911.4	312.3 313.4	0.93 0.88	8 10	1875.4	314.6	0.97
10,696	β 156	20 59 13	+21 24	7.1, 9.4	1898.5	246.4	1.04	5	1875.4	241.6	1.05
*10,685	Σ 2744	20 59 14	+46 17	6.3, 7.0	1898.5 1903.5	166.5 162.9	1.48 1.38	8 9	1830.2	190.5	1.52
10,700	Ho. 281	20 59 15	+ 1 15	7.0, 13	1906.8	300.3	13.53	1	1889.9	298.8	13.08
10,705	β 1138=Ho. 282	21 0 9	+23 42	7.2, 8.5	1897.9 1908.4	189.2 175.1	0.36 0.26	1 3	1889.4	188.7	0.29
*10,709	Secchi 3= Σ 2749 BC	21 0 9	+45 33	9.5, 9.5	1899.3 1910.8	154.3 160.6	1.01 0.84	6 2	1856.6	127.0	0.6 \pm
	AB= Σ 2749			7.7, 8.9	1899.3 1910.8	155.6 159.7	2.86 2.36	6 2	1830.1	148.7	3.51
	AC				1897.7	154.8	4.33	3			
	AD				1899.3	149.7	0.52	4			
10,718	Σ 2750	21 0 59	+ 3 14.	7.8, 9.3	1903.9	280.4	15.68	1	1829.5	281.5	15.93
10,726	A. 178	21 1 27	+12 26	8.1, 9.3	1910.9	73.9	0.87	5	1900.7	72.0	0.82
*10,725	Σ 2754	21 2 32	+21 0	8.0, 8.7	1903.9	300.3	32.72	1	1829.3	303.2	34.58
10,738	β 679	21 2 38	+12 53	10, 10	1896.6	54.0	0.42	1	1878.1	68.1	0.38
*10,741	Σ 2759	21 3 3	+43 23	8.5, 9.5	1904.7	324.7	16.28	1	1830.9	316.4	14.57
10,748	Hu. 691	21 3 21	+32 9	8.5, 9.0	1904.7	318.7	0.25	1	1903.5	310.9	0.33
*10,746	Σ 2760	21 3 42	+34 37	7.3, 8.1	1904.7	227.3	5.99	1	1829.9	223.2	13.66
10,752	Σ 2761	21 3 42	+33 50	8.7, 9.2	1905.4	113.1	5.47	3	1831.5	112.2	5.41
*10,749	O Σ 527	21 4 9	+24 11	6.5, 8.0	1900.5 05.8 13.8	276.1 271.1 266.9	0.40 0.35 0.25	5 1 1	1846.9	306.2	0.40
10,753	Ho. 150	21 4 16	+ 4 51	9.0, 11.5	1906.7	135.1	2.69	2	1882.0	135.6	2.97
*10,773	Σ 2762	21 4 28	+18 33	6.0, 8.0	1904.7	310.0	3.40	3	1829.8	315.6	3.55
10,775	Σ 2763	21 5 27	+29 54	8.5, 9.7	1905.8	292.9	17.32	1	1829.1	294.2	16.84
10,782	Knott 4	21 5 58	+17 3	4.2, 11.0	1901.6	273.3	2.33	1	1867.5	276.8	2.13
10,792	Σ 2767	21 6 41	+ 9 50	7.8, 8.2	1904.4	30.2	2.33	3	1830.4	30.6	2.46
10,795	Σ 2769	21 7 5	+19 39	6.5, 7.5	1904.4	299.7	18.24	3	1830.2	300.8	17.83
10,788	Ho. 151	21 7 9	+22 9	8.5, 8.5	1906.6	192.0	1.78	1	1884.9	190.3	1.05
10,794	Σ 2765	21 7 10	+ 3 33	7.8, 8.0	1904.6	85.6	2.90	6	1830.5	85.7	2.99

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*10,809	OΣ 430	h m s	° '	7.8, 9.8	1909.6 13.9	° 205.1 204.4	" 1.36 1.37	7 8	1846.8	° 219.5	" 1.50
10,817	Ho. 152	21 9 16	+28 2	8.4, 8.5	1898.2 1902.1 11.2	324.4 323.4 327.5	0.56 0.47 0.44	8 9 9	1882.7	320.2	0.49
10,819	β 681	21 9 46	+16 37	7.0, 11.3	1913.7	238.6	2.34	1	1878.6	239.7	2.51
*10,829	OΣ 535	21 10 49	+ 9 42	4.5, 5.0	1895.71 99.73 1900.61 00.87 01.58 01.73 01.70 01.84 01.80 01.87 02.76 03.81 04.78 05.79 06.62 06.79 07.78 07.78 07.94 08.78 09.61 09.68 09.78 10.75 11.69 12.79 13.48 13.65 13.78 14.70 15.74	round 194.0 206.0 245 ± 190.6 67.2 161.2 51.6 205.3 196.5 26.6 25.2 17.4 7.6 309 ± 221.9 150.8 85.8 140 ± 34.8 19.0 27.0 21.1 16.4 3.3 251.7 194.6 200.1 63.7 27.6 21.5	0.24 0.33 .. 0.23 0.09 <0.1 0.10 elong. <0.1 0.20 0.31 0.26 0.23 .. 0.18 0.14 0.14 .. 0.24 .. elong. 0.24 0.23 0.18 0.14 0.17 0.14 0.19 0.26 0.30	2 4 1 1 6 5 1 4 3 1 6 13 12 2 7 7 6 1 16 1 1 7 5 5 3 1 1 3 4 2	1852.65	20.6	0.44
	AB, C=Σ 2777			4.1, 10.2	1905.8	18.4	45.02	1	1833.2	38.8	27.40
*10,833	Hu. 767	21 10 57	+15 40	7.0, 7.0	1906.79 1907.74 1908.70 1908.77 1908.88 1909.68 1909.86 1911.78 1912.76 1912.87 1913.48	157.4 143.6 132.0 103.9 179.7 87.4 104.8 148.3 125.4 156.5 180.3	0.25 0.18 0.21 0.16 0.22 0.16 0.25 0.24 0.25 0.22 0.14	2 2 1 1 1 2 1 1 2 1 1	1903.36	162.4	0.22
*10,841	OΣ 432	21 11 26	+40 50	6.8, 7.2	1912.8	124.8	1.25	10	1847.9	130.4	1.20
*10,846	A. G. Clark 13	21 11 47	+37 43	4.9, 7.4	1896.56 99.34	336.9 309.2	0.48 0.59	1 2	1875.1	174.5	1.24
10,848	Ho. 284	21 12 27	+15 40	9.0, 9.3	1907.1	89.5	3.67	5	1886.8	86.0	3.81
10,851	β 1261	21 12 36	+15 47	8.5, 9.7	1910.6	146.6	1.48	9	1891.9	148.9	1.72
*10,871	β 162	21 14 4	+35 27	8.0, 8.5	1913.3	246.1	1.21	6	1875.1	240.5	1.05

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
10,879	Ho. 153	h m s	° ' "			°	"			°	"
		21 14 32	+33 26	8.0, 9.0	1910.8	122.4	0.81	4	1883.6	111.0	0.79
*10,883	Σ 2785	21 14 40	+39 26	8.1, 10.0	1904.4	239.8	3.10	2	1832.1	234.9	2.49
*10,880	β 163	21 14 58	+11 15	7.1, 9.0	1895.7 99.8	246.9 253.5	0.63 0.69	2 3	1876.1	252.3	1.15
10,887	Ho. 154	21 14 59	+30 16	7.8, 11.0	1906.9	208.6	3.61	1	1882.9	205.1	3.58
*10,908	Ho. 286	21 16 21	+37 55	6, 6	1906.72 07.76 08.79 09.86 11.80 12.87 13.66 13.79 13.79 13.88 14.52 15.82	287.6 304.9 328.6 8.9 314.4 6.8 12.5 300 \pm 333 \pm 304.3 291.1 88.4	0.31 0.16 0.15 0.14 0.22 0.18 0.15 . . 0.15 0.16 0.20	1 1 1 1 2 1 3 1 1 2 1 1	1886	250 \pm	0.3 \pm
10,909	Ho. 155	21 16 31	+32 56	8.0, 9.5	1907.4	35.0	2.26	4	1884.8	31.6	2.18
*10,910	β 838	21 17 7	+ 2 48	7.6, 9.5	1899.7 1911.8	98.6 107.2	1.45 1.59	5 2	1881.7	90.3	1.29
10,915	A. 295	21 17 20	+27 24	8.5, 8.7	1910.9 14.3	230.8 231.3	0.37 0.37	6 7	1901.8	227.9	0.47
*10,922	$O\Sigma$ 437	21 17 39	+32 8	6.5, 7.2	1904.8 12.3	43.2 39.3	1.78 1.77	1 13	1845.4	67.7	1.37
10,916	A. 617	21 17 42	+10 1	7.0, 7.0	1911.3	276.1	0.20	7	1903.8	272.5	0.18
10,948	Σ 2792	21 19 49	+28 38	8.5, 10.0	1904.7	329.3	7.10	1	1829.1	331.0	7.04
10,949	Ho. 157	21 19 49	+31 43	7.7, 7.7	1907.3	23.1	3.74	4	1882.0	21.3	3.81
10,946	Σ 2791	21 19 57	+ 4 3	8.5, 9.0	1911.9	102.9	2.39	6	1827.5	104.4	2.40
13,573	A. 1219	21 21 17	+29 55	9.3, 9.4	1907.4	121.9	1.38	3	1905.7	123.8	1.49
10,969	β 164	21 21 25	+ 9 4	8.0, 8.5	1911.4	237.9	0.49	5	1875.5	241.6	0.57
	AB, C= Σ 2793			7.0, 8.7	1909.7	241.6	26.58	1	1828.8	242.2	26.51
13,575	A. 1220	21 21 57	+31 9	8.5, 9.0	1907.8	145.5	1.73	2	1905.7	148.4	1.38
10,985	Σ 2797	21 23 5	+13 22	6.7, 8.2	1904.4	215.3	3.09	3	1830.4	213.3	3.18
10,999	Hu. 276	21 24 57	+ 7 23	9.3, 9.7	1906.8	26.7	0.85	1	1900.6	27.3	0.91
11,003	Ho. 160	21 25 9	+42 45	8.3, 9.0	1907.9	178.9	1.72	1	1886.9	171.3	1.92
*11,001	Σ 2799	21 25 13	+10 46	6.6, 6.6	1897.1 1903.0 11.7	298.9 296.9 292.0	1.36 1.42 1.45	12 16 9	1831.8	332.9	1.35
11,028	Hn. 45	21 27 14	+34 44	8.5, 9.1	1911.6	16.8	1.23	5	1881.5	17.8	1.28
11,040	Ho. 161	21 28 23	+39 44	7.0, 11.0	1906.9	359.5	2.50	1	1881.6	358.4	2.80
*11,042	Σ 2802	21 28 39	+33 29	8.0, 8.0	1905.6	8.4	3.69	4	1830.5	11.3	3.84

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,045	Ho. 603 BC	h m s	° '			°	"			°	"
	AB	21 28 54	+33 52	9.0, 10.5	1906.9	273.1	3.54	1	1896.4	270.8	3.26
				7.0,	1906.9	251.1	81.62	1	1896.4	251.9	80.55
*11,051	Σ 2804	21 29 30	+20 23	7.3, 8.0	1896.2 1903.2	332.5 333.7	3.08 2.83	7 18	1828.8	314.4	2.93
11,055	Ho. 604	21 29 40	+39 28	9.0, 9.5	1907.4	316.3	5.20	2	1895.6	314.5	4.84
11,072	Hu. 371	21 32 3	+24 7	7.0, 7.5	1908.5 12.8	159.2 166.6	0.22 0.20	9 13	1901.8	162.7	0.22
11,081	H. 939	21 32 31	+30 40	8, 14	1904.8	174.4	14.67	2	1820+	170±	6±
	AC=Σ 2808 R			10.3	1905.9	292.4	40.60	2	1879.6	290.6	41.29
11,082	H. 940	21 32 31	+30 43	9.0, 9.3	1905.9	325.8	19.01	2	1879.6	320.4	19.42
11,085	Ho. 163	21 32 45	+31 17	8, 13	1903.7	42.6	6.64	1	1886.8	43.1	6.94
11,088	β 167	21 32 57	+29 43	7.0, 11.4	1904.2	91.4	1.92	2	1876.5	89.2	2.08
11,119	Hu. 372	21 34 53	+23 16	9.0, 9.0	1908.5	147.1	0.36	4	1901.8	142.2	0.30
11,126	OΣ 444	21 35 35	+20 16	7.4, 10.4	1904.7	274.5	8.12	1	1851.0	275.7	7.96
*11,125	β 1212	21 35 39	- 0 24	6.5, 6.9	1901.54 10.72 14.00	269.4 278.2 292.5	0.49 0.43 0.47	10 5 8	1890.75	254.5	0.45
	AB, C			10.9	1914.9	148.0	42.07	1	1891.8	141.0	44.46
11,133	Σ 2814	21 35 48	+36 2	8.3, 9.8	1904.1	161.1	7.92	3	1831.1	162.5	7.82
11,130	OΣ 445	21 35 50	+20 23	8.0, 8.5	1904.7	113.7	0.72	1	1847.5	113.1	0.78
*11,168	OΣ 448	21 37 41	+29 0	7.7, 8.7	1909.2 13.3	229.6 228.5	0.71 0.71	7 12	1845.6	247.7	0.70
11,173	Ho. 164	21 37 52	+34 44	8.0, 8.0	1910.3	64.1	3.36	7	1882.2	61.8	3.04
11,178	β 274	21 38 16	+39 8	7.8, 10.9	1911.9	180.7	3.15	1	1875.9	180.7	3.45
11,177	Σ 2818 R	21 38 29	+18 37	8, 10	1902.5	21.2	20.37	3	1905.4	20.1	20.61
11,176	Hu. 280	21 38 34	+ 5 34	7.7, 8.1	1908.2	136.3	0.24	6	1900.6	138.2	0.19
11,179	Ho. 165	21 38 34	+18 39	8.0, 8.2	1900.7 08.5	70.9 70.5	0.41 0.39	9 9	1886.8	62.7	0.39
11,200	β 688	21 39 31	+40 42	7.6, 7.6	1913.79	190.2	0.20	1	1878.36	208.7	0.35
11,201	Hu. 374	21 40 0	+23 32	9.0, 9.0	1907.7	32.8	0.33	3	1901.8	38.5	0.33
*11,210	Ho. 166	21 40 41	+27 30	7.5, 7.5	1901.2 06.1 12.5	93.4 79.1 64.8	0.34 0.33 0.26	14 19 5	1886.8	124.2	0.37
*11,214	Σ 2822	21 40 46	+28 30	4.0, 5.0	1897.4 1903.5 12.9	123.7 123.7 129.4	2.83 2.33 1.72	8 19 13	1831.6	114.5	5.56
	AC			11.5	1914.9	262.4	43.38	1	1878.9	263.2	35.34
*11,218	Ho. 605	21 40 54	+34 32	9.2, 9.9	1905.3	354.5	2.01	3	1894.3	338.2	1.17

β.G.C.	Name.	1925°.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,224	Hu. 693	h m s	° ′			°	"			°	"
		21 41 12	+50 13	8.7, 9.2	1905.9	226.0	1.07	1	1904.4	230.4	1.06
*11,222	β 989	21 41 14	+25 18	4.8, 5.3	1894.85	114.8	0.13	4	1880.68	137.9	0.2±
					94.89	112.2	..	1			
					95.73	103.0	..	1			
					95.75	104.8	0.12	6			
					95.78	104.3	0.17	2			
					96.65	81.3	0.10	6			
					97.57	27.0	0.09	4			
					97.77	16.6	..	1			
					97.80	4.8	..	1			
					97.90	342.0	..	1			
					98.69	299.3	0.27	5			
					98.88	288.2	0.31	6			
					99.75	274.4	0.18	11			
					1900.02	265.7	0.14	1			
					00.68	254.3	0.14	9			
					01.02	238.4	0.13	4			
					01.62	198.1	0.11	13			
					02.77	151.2	0.16	13			
					03.78	132.9	0.18	8			
					04.82	123.4	0.22	7			
					05.80	113.0	0.25	15			
					06.77	106.6	0.25	14			
					07.78	96.1	0.15	15			
					08.65	70.1	elong.	1			
					08.76	72.8	0.13	5			
					08.77	59.8	<0.1	2			
					08.84	55.8	0.15±	1			
					09.60	321.7	0.17	2			
					09.61	354±	0.1	1			
					09.73	330±	elong.	1			
					09.81	298.3	0.15	2			
					09.85	314.7	elong.	1			
					10.71	280.4	0.15	3			
					11.69	279.3	0.23	5			
					12.71	246.6	0.20	5			
					13.75	206.4	0.18	8			
					14.73	158.1	0.22	3			
					15.74	131.5	0.15	2			
	AC				1897.6	298.7	12.38	13			
					1907.5	297.3	12.73	12			
	AB, C=Σ 2824			3.9, 10.8	1906.7	297.4	12.58	9	1831.6	308.5	11.01
11,232	Ho. 606	21 41 56	+27 1	8, 12.3	1906.8	94.8	17.57	1	1895.8	89.6	16.24
11,233	A.G. 276	21 42 3	+21 35	8.8, 9.2	1910.5	357.0	1.93	10	1901.7	357.2	2.05
11,240	A.G. 277	21 42 35	+20 50	9.0, 9.0	1910.7	236.0	2.37	8	1901.7	54.3	2.50
11,234	Lewis 36	21 42 39	+25 12	9.5, 10.0	1906.3	295.5	4.71	4			
11,248	Ho. 465	21 42 56	+21 49	7.2, 9.2	1907.8	246.0	42.53	2	1893.4	245.8	42.22
*11,246	Σ 2825	21 43 4	+0 30	8.0, 8.2	1901.7	116.3	0.92	9	1827.7	100.2	1.09
11,255	Ho. 608	21 43 36	+26 57	8.2, 9.7	1905.6	123.7	0.54	5	1895.8	119.9	0.39
11,261	Ho. 466	21 44 10	+34 32	8.7, 9.2	1907.4	141.9	1.84	2	1893.3	138.9	1.39
11,276	Σ 2829	21 46 6	+30 24	8.2, 8.9	1904.3	15.5	17.38	2	1831.9	15.6	17.05

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,281	Ho. 169	h m s 21 46 25	° ' " +35 46	8.0, 12	1907.9	° 137.1	" 3.18	1	1882.7	° 134.8	" 3.20
11,289	Ho. 467	21 47 8	+21 54	8.0, 10.2	1906.9	185.2	1.32	6	1893.3	181.5	1.03
11,296	Σ 2831	21 47 34	+ 7 59	8.1, 11.1	1905.9	355.0	14.69	1	1829.0	356.3	14.97
11,303	Σ 2834	21 48 9	+18 57	7.3, 10.6	1905.2	291.2	3.96	3	1830.8	288.8	4.13
11,302	Σ 2833	21 48 15	+ 8 43	7.2, 10.0	1905.9	338.5	8.88	1	1829.6	341.5	8.83
11,311	Ho. 171	21 48 46	+27 27	8.2, 8.2	1899.7 1903.5 11.2	173.4 173.4 173.1	0.70 0.76 0.73	5 22 7	1884.9	179.0	0.63
11,335	Σ 2841	21 50 46	+19 22	6.5, 8.0	1904.9	111.2	22.49	1	1829.5	111.0	22.21
11,345	Ho. 173	21 51 43	+18 21	8.0, 10.0	1906.8	82.0	1.17	1	1881.7	72.6	1.06
*11,346	β 75	21 51 52	+10 32	8.1, 8.5	1898.1 1905.4 12.6	38.7 44.8 49.0	1.06 0.92 0.92	14 7 5	1875.5	34.3	1.20
11,354	Σ 2846	21 51 53	+45 26	8.5, 10.3	1903.9	274.3	3.24	1	1833.9	269.3	3.25
11,347	OΣ 452	21 51 56	+ 6 54	7.7, 8.8	1910.7	176.2	1.01	7	1847.5	179.1	1.19
11,353	Ho. 609	21 52 4	+29 22	9.5, 9.8	1906.1	356.4	3.25	4	1893.3	356.4	1.84
	AC			13	1905.9	133.4	13.25	1			
	AD			12	1905.9	147.4	22.25	1			
	AE			13	1905.9	348.1	25.83	1			
11,355	Battermann	21 52 17	+15 15	9.2, 9.3	1909.7	162.2	1.57	1	1893.8	160±	1.5±
11,358	A.G. 278	21 52 21	+32 40	9.5, 9.5	1911.2	157.8	3.17	3	1902.7	159.0	3.24
11,362	OΣ 453	21 52 45	+ 6 53	7.5, 8.0	1909.7	265.3	0.60	2	1847.5	270.9	0.70
11,385	Σ 2847	21 54 9	- 3 51	7.6, 8.0	1905.9	301.4	1.12	1	1832.0	296.5	1.21
11,388	Σ 2849	21 54 11	+19 53	8.2, 10.7	1898.0 1902.1 11.7	263.6 264.3 260.3	1.44 1.45 1.49	6 6 6	1830.4	272.4	1.09
11,387	Σ 2848	21 54 16	+ 5 35	7.2, 7.5	1905.8	58.2	10.68	1	1829.4	54.9	10.45
11,416	Σ 2850	21 56 22	+23 35	7.2, 11.2	1904.9	257.7	2.87	1	1830.1	263.3	2.83
11,441	Σ 2852	21 57 52	+53 49	9.0, 9.0	1905.9	173.2	7.57	1	1832.4	171.9	7.73
11,440	Ho. 176	21 58 20	+23 12	8.0, 11.5	1899.7	183.9	0.93	2	1881.7	188.1	0.91
11,443	Ho. 610	21 58 37	+26 29	9.0, 9.2	1905.5	235.0	0.74	4	1897.2	236.3	0.60
11,462	Σ 2854	22 0 43	+13 17	7.7, 8.0	1904.8	84.5	2.64	2	1830.1	83.1	3.10
11,464	β 696	22 0 53	+15 30	8.0, 8.0	1912.6	355.8	0.48	6	1877.3	355.1	0.50
11,475	Σ 2856	22 2 4	+ 4 30	8.2, 8.8	1905.9	199.4	1.27	1	1830.5	200.9	1.07
11,484	Σ 2859	22 2 26	+20 14	9.0, 9.8	1904.9	339.3	3.56	1	1830.4	341.8	3.17
11,486	Σ 2861	22 2 29	+20 26	7.7, 8.2	1904.8	220.4	6.97	3	1830.1	219.9	7.13

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*11,490	Σ 2862	h m s	° ' "			°	"			°	"
		22 3 15	+ 0 12	7.6, 8.0	1905.9	101.7	2.58	1	1828.8	104.0	2.34
11,496	Ho. 611	22 3 18	+27 57	8, 12	1906.8	86.5	18.22	1	1895.0	84.5	17.35
11,506	O Σ 462	22 3 46	+35 44	7.2, 9.0	1910.8	323.1	1.22	1	1848.5	334.4	1.43
11,507	A. 308	22 4 1	+25 16	8.5, 8.8	1910.6	116.3	0.23	1	1901.7	118.0	0.19
11,521	β 842	22 5 46	+ 5 19	8.8, 9.1	1912.7	121.4	1.15	2	1881.7	121.1	1.26
11,523	Σ 2868	22 5 50	+22 10	8.3, 8.8	1904.8	357.9	1.01	2	1830.4	5.1	1.12
11,531	Σ 2866	22 6 6	+40 17	8.8, 11.3	1903.7	55.0	8.91	1	1832.1	53.3	9.03
11,527	Σ 2867	22 6 20	+ 7 35	7.9, 9.0	1905.8	208.0	10.75	1	1831.0	208.1	10.46
*11,556	O Σ 464	22 8 3	+39 48	7.8, 8.0	1911.8	66.6	0.49	1	1847.7	54.2	0.83
11,564	Σ 2876	22 8 44	+37 17	7.7, 9.2	1904.9	68.3	11.71	1	1829.4	68.4	11.79
13,613	Hu. 978	22 9 6	+13 32	8.5, 9.0	1909.9	223.4	0.62	5	1901.8	226.5	0.72
11,566	Ho. 179	22 9 13	+29 50	8.0, 9.0	1900.7 06.7	260.1 263.5	0.46 0.51	11 7	1884.9	246.3	0.47
11,579	β 699	22 10 0	+ 7 20	8.1, 12.2	1896.8	186.3	(0.96)	1	1878.4	187.3	2.04
*11,592	Σ 2877	22 10 43	+16 49	6.4, 9.6	1905.8	4.4	12.42	2	1829.0	316.4	7.63
*11,590	Σ 2878	22 10 46	+ 7 36	6.5, 8.0	1897.0 1902.5	126.4 124.5	1.29 1.17	14 3	1830.3	130.8	1.36
11,598	Σ 2882	22 10 59	+37 22	9.2, 9.2	1904.3	327.6	2.90	2	1832.2	326.5	3.22
*11,599	Σ 2881	22 11 9	+29 12	7.7, 8.2	1898.1 1902.6 11.5	99.1 98.6 98.8	1.55 1.42 1.56	18 14 14	1830.5	111.4	1.76
11,601	A.G. 281	22 11 16	+21 34	8.8, 9.8	1909.8	21.2	2.45	10	1902.9	21.3	1.88
11,602	O Σ 467 rej. = Ho. 613	22 11 17	+22 9	6.3, 10.3	1906.9	273.4	23.11	2	1865.9	273.8	22.83
11,612	Ho. 614	22 12 8	+51 6	7.5, 10	1905.9	177.0	5.07	1	1897.3	174.9	4.63
11,613	Σ 2890	22 12 12	+49 30	8.5, 8.7	1905.7	10.8	9.30	1	1832.3	11.7	9.06
11,620	Ho. 180	22 12 41	+43 31	7.2, 7.2	1903.6	225.1	0.54	6	1886.8	222.5	0.50
11,618	Σ 2889	22 12 51	+25 54	8.2, 10.8	1904.9	189.5	2.02	2	1830.4	199.5	2.21
11,627	Hu. 287	22 14 7	+ 7 55	8.2, 13.5	1909.7	56.2	1.96	1	1900.6	67.7	1.55
11,632	H. 961 = Ho. 473	22 14 34	+18 13	8.9, 14	1906.9	286.6	16.83	2	1820+	275±	5±
11,642	Hu. 383	22 16 2	+20 45	9.0, 9.0	1910.7	42.2	0.18	1	1901.7	42.6	0.24
*11,650	β 1216	22 16 46	+29 9	8.4, 8.7	1897.9 1901.5 11.3	311.7 311.9 304.1	0.51 0.54 0.54	14 6 6	1890.5	317.7	0.64
*11,657	Σ 2895	22 17 14	+24 35	8.5, 10.0	1907.3	35.4	8.13	6	1830.1	6.1	4.85
	Bowyer	22 17 18	+24 33	10.0 10.5	1906.8	80.1	11.94	2	1905.6	78.9	11.98

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,666	Ho. 615 AB	h m s 22 17 51	° ' " +27 58	5 , 9.3	1906.9	127.1	72.80	2	1893.8	127.1	72.78
	BC			11.0	1906.9	19.1	2.38	2	1895.7	18.3	2.36
	AD			12.0	1906.9	305.3	42.76	1	1895.8	309.6	41.98
	AE			12.0	1906.9	109.6	60.25	1	1893.8	116.3	60.33
11,667	Σ 2897	22 18 10	+14 53	8.7, 9.5	1905.8	99.7	17.31	3	1829.5	100.2	16.72
11,671	Σ 2898	22 18 35	+10 43	8.3, 9.5	1905.9	283.0	13.10	1	1829.1	282.3	12.34
11,682	Ho. 292	22 19 29	+ 5 17	8.0, 11.5	1908.7	67.4	3.81	2	1887.8	61.1	3.61
*11,687	Ho. 182	22 19 47	+17 11	8.5, 8.5	1907.2	128.5	1.44	7	1884.8	135.0	1.55
*11,690	Σ 2900	22 20 1	+20 29	6.0, 9.2	1898.1 1904.7 12.3	177.0 178.5 175.9	1.40 1.45 1.32	15 13 16	1832.4	180.7	2.47
11,693	Hu. 493	22 20 9	+18 51	9.0, 9.5	1910.9	168.0	0.68	1	1901.7	167.7	0.78
*11,691	β 172	22 20 13	- 5 13	6.7, 6.7	1901.3 13.1	7.7 357.0	0.64 0.71	11 8	1875.7	20.4	0.46
11,697	Hu. 385	22 20 20	+22 10	8.7, 15.0	1910.8	72.7	1.44	1	1901.7	76.8	1.35
11,702	Σ 2902	22 20 24	+44 59	7.1, 8.0	1904.7	91.0	6.36	2	1833.5	89.9	6.40
11,705	Ho. 183	22 21 14	+22 12	8.2, 11.6	1906.8	219.1	2.37	3	1883.3	216.7	2.07
11,714	Espin 147	22 21 36	+54 30	8.3, 10.2	1905.9	18.6	2.42	1	1902	25.1	2.0
*11,712	Ho. 616	22 21 51	+22 12	7.2, 12.5	1907.4	356.6	19.26	2	1895.3	1.2	18.69
*11,715	South 345	22 22 29	-17 7	6 , 6.5	1911.8	308.0	6.20	1	1823.9	303.1	10.03
11,719	Hu. 596	22 22 53	+19 2	9.5, 10.0	1910.8	13.2	1.33	1	1901.7	20.7	1.16
11,728	Σ 2906	22 23 25	+37 4	7.0, 10.6	1904.8	2.8	4.00	3	1832.4	4.4	4.54
11,726	Σ 2905	22 23 32	+14 46	8.5, 8.5	1905.4	283.5	3.18	2	1829.5	283.8	3.28
*11,732	β 291	22 23 55	+ 4 9	8.4, 8.4	1900.3 11.2	168.6 174.8	0.43 0.35	9 2	1875.8	157.8	0.33
	AB, C				1899.8	125.1	31.90	1	1898.8	125.0	31.06
*11,736	β 701	22 24 21	+11 52	7.0, 10.0	1905.7	266.0	1.08	3	1877.8	283.4	1.24
11,737	Σ 2908	22 24 32	+16 53	7.0, 8.7	1904.4	115.4	8.86	2	1828.8	116.3	8.86
*11,741	Σ 2910	22 24 38	+23 9	8.3, 8.8	1904.6	339.1	5.35	3	1832.1	347.2	5.30
11,742	β 1218	22 24 38	+29 19	8.6, 8.8	1898.7 1910.8	53.6 55.7	1.54 1.38	22 6	1890.5	53.5	1.44
*11,743	Σ 2909	22 24 58	- 0 24	4.0, 4.1	1893.9 1912.4	316.6 309.9	2.67 2.68	1 2	1825.7	359.8	3.60
*11,761	Krueger 60	22 25 22	+57 20	9.0 12.0	1902.72	122.0	3.49	1	1890.79	178.8	2.32
*11,763	Σ 2912	22 26 10	+ 4 3	5.8, 7.2	1900.7 12.1	288.9 297.4	0.32 0.32	9 3	1831.1	112.6	1.16

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,770	Hu. 388	h m s. 22 26 39	° ′ +22 5	8.0, 8.5	1910.7	142.0	0.19	1	1901.7	141.3	0.24
11,784	Σ 2916	22 28 2	+40 50	7.3, 8.8	1904.7	336.0	44.77	2	1833.4	335.3	45.25
	BC			10.2	1904.7	31.7	3.81	2	1833.4	30.6	3.51
11,793	Ho. 475	22 29 13	+26 2	8.0, 8.2	1907.4 11.6	317.4 316.3	0.80 0.84	9 7	1893.8	325.7	0.67
	AC			10.2	1908.6	225.0	7.84	4	1893.8	224.1	7.69
	BC			8.2, 10.2	1909.2	224.5	8.22	11			
11,812	β 705	22 30 16	+40 26	7.0, 12.5	§1902.72 † 03.99	74.0	0.72	1	1878.5	158.0	1.5±
11,810	Ho. 476	22 30 21	+26 12	9.0, 9.3	1907.3	205.5	6.66	5	1892.3	206.5	6.48
11,813	Ho. 477	22 30 30	+29 21	8.0, 11.0	1906.8	166.0	13.01	1	1892.4	165.6	12.69
11,818	H. 1785=Ho. 478	22 31 9	+29 20	8.3, 8.7	1907.1	171.6	14.26	3	1828+	175.7	12±
11,821	Ho. 617	22 32 22	+21 55	7, 12.5	1906.8	53.8	17.92	1	1895.7	52.3	16.89
11,844	Ho. 186	22 33 5	+27 24	7.0, 12.2	1910.9	24.1	7.67	1	1881.7	23.3	7.38
11,851	Ho. 294	22 34 2	+27 3	8.0, 10.0	1907.5	59.7	2.05	3	1889.8	54.5	1.82
11,850	Σ 2925	22 34 6	+ 5 31	8.7, 9.5	1913.4	3.9	7.48	3	1830.0	3.6	7.06
11,861	Ho. 480	22 34 53	+29 19	8.0, 9.1	1908.1	226.0	0.72	3	1892.8	224.8	0.74
11,865	Hu. 392	22 35 20	+18 26	9.2, 9.5	1910.8	335.8	0.52	1	1901.7	344.5	0.51
11,870	Σ 2929	22 35 35	+10 9	9.0, 9.5	1905.4	358.3	1.69	2	1828.1	358.0	1.87
*11,895	Ho. 296	22 37 9	+14 9	5.5, 5.5	1900.62 02.79 03.84 05.33 07.38 08.41 11.13	62.9 86.4 75.4 67.0 64.4 60.8 53.9	0.33 0.25 0.35 0.40 0.40 0.39 0.35	5 5 5 4 5 5 5	1888.8	225±	0.5±
11,897	Σ 3134	22 37 12	+29 36	9.0, 9.3	1905.9	76.5	6.27	2	1832.5	76.2	6.06
11,901	Hu. 780	22 37 31	+14 9	9.2, 9.2	1908.4	10.8	0.36	5	1904.4	1.4	0.29
11,902	Σ 2931	22 37 34	+12 47	8.5, 9.4	1905.3	147.4	4.32	3	1830.3	147.8	4.46
11,906	Σ 2932	22 37 56	+29 39	8.7, 9.2	1905.9	280.6	20.24	2	1832.4	280.7	19.04
*11,908	Σ 2934	22 38 13	+21 2	8.2, 9.2	1898.5 1903.3 11.1	145.3 139.9 129.1	0.86 0.86 0.76	11 16 9	1830.8	187.8	1.22
11,909	Hu. 781	22 38 16	+14 50	8.5, 9.5	1907.9	311.9	0.30	1	1904.4	304.9	0.49
11,917	β 710	22 39 3	+29 19	8.5, 8.6	1899.3 1911.8	234.4 239.0	0.42 0.44	13 2	1878.7	231.2	0.59
11,924	β 1144	22 39 29	+29 50	10.1, 10.1	1898.4	87.3	0.33	8	1889.5	83.3	0.29

§ Observation uncertain.

† Companion not seen.

β.G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
11,936	Σ 2942	h m s 22 40 41	° ′ +39 4	7.0, 9.2	1905.9	282.0	2.74	2	1831.6	282.1	2.66
*11,943	β 711	22 41 43	+10 48	8.5, 10.5	1899.5 1914.8	44.6 29.2	0.96 1.05	10 1	1878.6	79.9	0.72
11,951	Ho. 481	22 42 10	+28 59	8.3, 8.3	1907.7	114.1	0.31	3	1892.4	117.7	0.25±
*11,952	Σ 2941	22 42 18	+18 51	7.5, 10.2	1905.0	263.1	11.00	2	1830.1	270.5	8.73
11,969	A. 189	22 43 42	+44 22	8.4, 8.5	1913.9	208.8	0.78	1	1900.8	201.9	0.92
*11,968	Σ 2944	22 44 0	- 4 37	7.0, 7.5	1899.8 1910.7	259.4 261.1	3.45 3.18	5 1	1833.0	246.9	4.12
	AC			8.2	1898.8	131.1	47.82	1	1833.0	157.3	55.64
11,971	β 1037	22 44 10	+12 36	8.7, 10.8	1899.9	232.3	0.69	1	1888.8	224.4	0.66
11,973	Ho. 297	22 44 15	+26 28	9.5, 10.0	1906.8	138.0	6.65	3	1883.8	141.1	6.70
*11,979	β 1146	22 44 55	+30 42	7.2, 8.2	1899.3	323.3	0.20	4	1889.6	335.3	0.23
11,987	Ho. 190	22 45 46	+27 37	9.2, 9.2	1907.1	153.8	1.99	4	1881.8	152.8	2.04
11,989	Σ 2945	22 46 9	+30 55	8.5, 8.5	1904.3	294.8	4.21	2	1832.1	292.6	3.88
11,991	Σ 2946	22 46 16	+40 7	8.0, 8.0	1905.1	255.5	5.36	3	1831.7	253.1	5.05
*12,008	Ho. 482	22 47 50	+25 59	6.8, 6.8	1906.88 07.77 08.77 09.97	73.0 56.9 44.1 50.4	0.14 0.22 0.20 0.23	1 5 1 1	1893.8	112.2	0.25±
12,014	Σ 2949	22 48 22	+29 38	8.8, 10.5	1904.9	183.9	11.16	1	1831.9	183.2	11.13
12,031	Ho. 191 AC	22 50 0	+30 21	7.0, 10	1907.9	279.7	24.20	1	1881.7	279.4	24.32
*12,036	β 382	22 50 18	+44 21	6.0, 8.0	1899.3 1911.9	228.5 236.6	0.80 0.68	6 1	1876.4	205.7	1.07
	AC			10.7	1911.9	356.9	26.74	1	1876.2	353.6	26.43
13,630	Hu. 987	22 52 3	+15 24	8.6, 8.8	1907.80 10.74	244.6 247.7	0.50 0.50	4 2	1904.70	246.5	0.65
12,058	β 383	22 52 12	+ 9 4	8.0, 12.7	1904.0	114.6	2.96	1	1891.8	118.7	2.58
	AC			12.4	1901.9	242.3	16.06	2	1891.8	239.0	15.43
12,063	Σ 2957	22 52 39	+17 4	8.6, 10.4	1908.8	224.2	4.87	5	1832.3	226.8	4.73
*12,065	Σ 2958	22 53 7	+11 26	7.2, 9.5	1904.0	8.4	4.17	2	1831.2	6.8	3.91
12,084	Ho. 484	22 54 28	+20 21	8.0, 12	1906.8	108.5	3.19	1	1893.1	100.4	3.08
*12,090	OΣ 536	22 54 45	+ 8 58	7.0, 7.5	1896.8 1903.3 10.7	185.9 162.5 161.7	0.32 0.29 0.19	1 5 1	1852.7	332.8	0.40
12,095	Σ 2967	22 55 21	+27 20	8.2, 9.8	1904.9	5.9	6.33	1	1831.3	6.8	6.67
*12,094	OΣ 483	22 55 27	+11 20	6.2, 7.7	1897.8 1902.6 13.1	217.1 225.7 231.9	0.82 0.94 0.87	6 11 12	1845.3	180.8	0.94

β .G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
12,103	Ho. 192	h m s 22 56 11	° ' +29 41	8.5, 9.5	1907.3	° 30.0	" 1.64	4	1884.9	° 30.8	" 1.62
*12,104	Hn. 56	22 56 14	+41 26	8.4, 8.5	1911.9	117.9	0.87	1	1881.4	125.2	0.93
12,111	Σ 2968	22 57 6	+30 41	7.0, 9.5	1904.3	90.8	3.37	2	1832.3	90.4	3.35
12,113	Σ 2969	22 57 28	+26 23	8.0, 9.9	1904.9	31.1	3.76	1	1831.9	34.6	4.00
12,120	Hu. 398	22 58 41	+18 13	8.7, 9.0	1906.8	323.8	0.37	1	1901.7	321.6	0.44
*12,125	β 1147	22 59 8	+42 22	5.0, 8.7	1902.9	325.2	..	1	1889.5	317.8	0.28
12,135	Ho. 193	23 0 6	+29 31	7.2, 11.2	1910.5	166.4	2.49	3	1883.8	169.1	2.83
12,133	A.G. 289	23 0 8	+22 46	9.2, 9.2	1904.8 11.5	51.3 47.6	1.61 1.58	2 4	1901.7	48.6	1.93
12,147	Σ 2974	23 1 26	+32 59	8.0, 8.0	1904.3	161.8	2.57	2	1831.7	159.7	2.83
12,160	Ho. 194	23 2 39	+41 24	7.0, 9.3	1898.8 1908.1	84.4 59.0	0.34 0.32	2 1	1885.8	59.9	0.3 \pm
*12,172	Σ 2976	23 3 4	+ 6 12	8.3, 10.2	1914.9	262.6	7.57	1	1828.4	262.1	7.94
	AC			8.8	1914.9	194.7	17.85	1	1828.4	177.7	15.89
12,170	O Σ 488 rej. = Ho. 486	23 3 44	+20 11	7.0, 10.7	1906.8	332.6	14.04	2	1865.9	334.9	13.45
12,173	Σ 2978	23 3 52	+32 26	6.8, 8.0	1905.2	145.2	8.35	5	1830.6	146.2	8.40
12,171	β 1025	23 3 53	+12 16	8.0, 10.8	1901.6	274.6	0.75	4	1891.6	268.6	0.77
	AC			11.9	1902.9	86.4	22.58	1	1891.6	84.3	22.16
*12,178	Σ 2979	23 4 16	+39 24	8.0, 10.0	1907.0	222.6	3.01	3	1831.9	218.4	3.09
12,181	Ho. 196	23 4 42	+30 4	8.0, 11.0	1908.4	289.6	1.83	3	1883.5	289.6	1.54
13,642	Hu. 995	23 4 58	+15 8	9.0, 9.7	1913.8	182.0	1.24	5	1904.7	186.5	1.34
12,186	Ho. 487	23 5 39	+18 21	6.7, 12.5	1906.8	122.0	18.31	2	1892.4	116.9	17.40
12,225	Σ 2989	23 9 27	+19 35	8.5, 9.9	1910.2	140.2	1.60	9	1835.7	141.5	1.59
12,229	Σ 2992	23 9 31	+39 36	7.5, 9.2	1905.9	286.6	14.28	1	1830.5	286.4	13.75
*12,228	Σ 2990	23 9 36	+21 41	8.5, 8.5	1906.7 11.9	63.1 62.5	2.06 1.91	6 7	1831.1	69.1	1.61
12,238	Ho. 299	23 10 18	+23 50	8.0, 10.2	1907.9	78.5	1.28	2	1887.8	76.0	0.87
12,265	Σ 2995	23 12 42	- 2 0	7.7, 8.0	1899.9	30.6	4.92	4	1830.5	26.7	4.56
*12,276	β 79	23 13 43	- 1 55	7.9, 9.6	1901.4 14.3	84.0 69.0	0.84 0.97	11 2	1876.4	115.3	1.03
12,277	Hu. 497	23 13 47	+16 27	8.0, 9.0	1907.5	33.4	2.29	8	1884.8	32.4	2.31
12,280	Hu. 400	23 13 54	+17 54	7.4, 8.8	1907.78 12.77	229.4 229.6	0.33 0.27	3 2	1901.8	249.1	0.32
12,294	Σ 3000	23 15 2	+24 48	8.7, 8.8	1905.0	52.3	3.40	3	1831.1	52.3	3.25

β.G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
*12,290	β 80	h m s	° ′	8.2, 9.1	1894.85	°	″	1	1875.80	°	″
		23 15 2	+ 5 0		98.88	325.1	0.63	2		300.4	1.07
					99.71	334.8	0.56	3			
					1900.93	348.1	0.46	1			
					01.79	10.7	0.27	3			
					02.75	19.6	0.23	1			
					02.92	39.3	0.29	1			
					03.88	9.3	0.45	2			
					11.82	63.5	0.23	2			
					13.79	226.2	0.35	1			
					14.73	237.5	0.49	1			
						233.6	0.45	1			
	AC			10.5	1902.9	4.7	103.95	1			
12,311	Ho. 488	23 17 1	+ 2 3	10, 11	1894.9	213.5	0.89	1	1890.9	215.9	0.67
	AB=Σ 3002			8.0, 10.2	1894.9	202.5	4.10	1	1831.8	201.7	4.04
					1911.9	198.1	3.76	1			
	AC				1894.9	204.3	5.74	1			
12,312	OΣ 494	23 17 6	+21 33	7.4, 8.1	1908.8	82.5	3.35	4	1850.3	83.6	3.34
*12,317	Σ 3006	23 17 35	+35 2	8.5, 9.0	1906.8	165.5	5.45	2	1831.6	182.8	4.65
12,325	β 718	23 18 14	+31 24	5.0, 8.7	1908.3	94.1	0.39	2	1878.7	88.3	0.47
12,332	Σ 3007	23 19 0	+20 9	6.5, 9.5	1904.5	84.0	6.16	2	1829.8	79.2	5.69
*12,340	Σ 3008	23 19 48	- 8 52	7.0, 8.0	1913.2	227.5	3.49	3	1830.4	273.3	7.54
12,346	β 719=Ho. 301	23 20 37	+14 4	8.0, 11.0	1904.9	2.5	1.18	2	1877.9	10.9	1.11
12,348	OΣ 495	23 20 43	+57 8	7.3, 7.5	1908.0	300.8	0.33	1	1846.6	310.4	0.56
	Espin 546†	23 21 20	+26 32	9.1, 10.8	1908.7	159.0	2.29	2	1907.7	162.2	2.37
12,364	Espin 108	23 22 9	+52 14	9.1, 9.2	1908.0	246.1	2.69	1	1901.	243.1	2.0
12,363	Ho. 489	23 22 17	+27 18	8.0, 8.0	1906.9	240.2	0.45	7	1889.9	241.2	0.44
12,378	Σ 3012	23 23 49	+16 13	8.7, 8.8	1905.5	191.5	2.83	4	1831.0	190.8	2.63
12,379	Σ 3013	23 23 49	+16 13	7.8, 9.3	1905.5	276.4	3.35	4	1831.0	270.0	2.58
*12,381	Σ 3014	23 24 8	+10 44	8.1, 10.4	1905.8	280.3	8.09	3	1830.9	281.3	7.24
12,386	Σ 3015	23 24 22	+33 9	8.7, 8.8	1904.0	190.8	3.07	1	1832.1	191.1	2.97
12,390	β 1222	23 24 41	+ 3 9	8.9, 9.0	1900.4	37.5	1.22	5	1890.8	37.4	1.14
13,649	Hu. 999	23 26 23	+13 33	9.2, 9.7	1911.6	142.2	1.70	4	1904.7	142.7	1.74
12,405	OΣ 496	23 26 32	+58 8	8.2, 9.8	1908.0	221.7	1.25	1	1881.2	223.1	1.44
*12,404	CD=Dawes. β 1266	23 26 42	+30 25	7.4, 7.4	1896.78	52.0	0.28	2	1891.7	74.0	0.24
					97.95	44.8	0.36	1			
					98.71	54.0	0.35	1			
					99.84	47.0	0.22	2			
					1901.01	31.7	0.14	1			
					01.88	13.8	0.22	4			
					02.82	13.1	0.19	5			
					03.95	22.1	0.13	1			
					13.79	206.4	0.16	1			
	AC=Σ 3018			7.2, 9.5	1900.9	203.7	18.92	6	1830.5	204.0	18.92

† B.D. +26°.4623.

β .G.C.	Name.	1925 ^o .		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
12,409	Σ 3020	h m s	° ' "			°	"			°	"
12,413	Σ 3021	23 27 19	+18 22	7.7, 9.7	1910.6	107.3	1.97	8	1831.9	111.0	1.73
12,420	Σ 3024	23 27 36	+15 48	7.7, 8.9	1904.5	307.2	8.52	2	1830.5	308.9	8.31
12,419	Hu. 298	23 28 22	+43 25	8.2, 9.0	1905.0	310.5	5.02	1	1830.5	311.6	4.87
12,423	Σ 3023	23 28 23	+ 6 40	6.8, 7.4	1907.7	76.1	0.28	2	1900.8	94.6	0.17
12,423	Σ 3023	23 28 36	+17 0	7.0, 9.7	1905.0	282.3	2.05	1	1831.1	281.9	1.91
*12,432	β 720	23 30 14	+30 55	6.0, 6.0	1898.6 1902.9 14.4	159.0 166.0 186.0	0.37 0.34 0.39	15 20 5	1878.7	127.7	0.40
12,453	Σ 3026	23 32 33	+28 29	8.8, 9.3	1905.0	278.8	3.39	2	1831.2	275.9	3.21
12,455	Hu. 791	23 32 36	+49 19	8.5, 8.5	1913.9	127.5	2.66	1	1904.4	127.5	2.83
12,462	Ho. 201	23 33 25	+34 14	8.0, 9.3	1906.4	341.4	3.91	2	1883.3	341.5	3.59
*12,468	O Σ 500	23 33 50	+44 1	6.1, 7.0	1908.1	333.2	0.55	2	1845.2	299.4	0.45
12,474	Hu. 792	23 34 29	+32 25	9.0, 9.3	1908.0	186.1	0.39	1	1904.5	188.8	0.31
12,476	Ho. 202	23 34 41	+40 4	8.3, 11.8	1908.0	138.9	2.19	1	1883.7	135.3	2.57
*12,479	Σ 3028	23 34 50	+34 37	7.0, 9.5	1905.9	203.4	17.31	1	1829.9	205.4	19.50
12,486	Ho. 203	23 35 24	+35 10	9.0, 10.0	1907.0	131.9	3.45	2	1881.8	128.4	3.53
12,493	Ho. 302 BC	23 36 29	+19 19	8.5, 12.0	1907.6	78.6	8.17	3	1887.4	76.1	8.28
12,501	Ho. 303	23 37 1	+19 57	8.0, 11.0	1906.9	187.4	1.15	1	1888.9	184.3	0.92
12,510	β 858	23 37 32	+32 9	7.7, 8.2	1898.2 1903.0	265.9 261.9	0.70 0.59	9 15	1881.6	276.6	0.48
	AB, C			12.8	1903.2	53.7	23.01	3	1881.6	51.0	23.66
13,655	A. 1242	23 39 16	+11 27	9.0, 9.0	1910.7	273.6	0.51	1	1905.6	265.7	0.52
12,529	β 994	23 39 47	+24 41	7.9, 11.0	1905.9	299.1	1.41	1	1880.6	306.5	1.38
*12,531	Σ 3033	23 40 7	+ 6 50	8.5, 8.5	1913.2	5.3	3.09	6	1832.1	9.9	3.33
*12,532	A. G. Clark 14	23 40 12	+28 58	5.0, 8.1	1898.6 1903.6 11.3	197.7 197.4 200.1	1.32 1.55 1.48	11 6 7	1876.6	192.0	1.45
12,540	β 1223	23 41 28	+ 4 42	8.1, 10.8	1898.0	294.8	1.19	1	1890.8	298.6	1.33
12,541	Hu. 300	23 41 41	+ 6 5	8.7, 9.0	1907.6 14.4	119.2 134.1	1.17 1.09	5 2	1900.8	123.3	1.11
12,548	Σ 3037	23 42 27	+60 3	7.0, 8.5	1899.1	213.7	2.67	1	1832.2	214.0	2.70
*12,552	Σ 3039	23 43 4	+28 0	7.3, 9.7	1905.9	33.3	32.63	1	1830.9	36.4	30.33
12,555	Barnard 19	23 43 11	+ 4 50	8.6, 8.6	1900.8	167.5	0.55	4	1889.6	166.2	0.54
12,562	β 995	23 43 48	+46 25	6.5, 8.5	1908.1	233.5	0.65	2	1880.0	245.4	0.88
*12,563	Σ 3041 CB	23 44 2	+16 40	7.3, 8.1	1904.9	178.9	3.48	2	1832.2	183.4	3.27
12,567	Σ 3040	23 44 17	+ 9 44	9.0, 9.0	1905.0	220.9	4.83	1	1830.1	217.0	4.38

β .G.C.	Name.	1925.0.		Mags.	Date.	Angle.	Dist.	n.	Early Observations.		
		R.A.	Dec.						Date.	Angle.	Dist.
12,587	O Σ 509	h m s	$^{\circ}$ ' "			$^{\circ}$	"			$^{\circ}$	"
12,587	O Σ 509	23 46 53	+43 0	7.6, 9.5	1908.1	104.7	5.41	3	1854.8	108.2	5.44
*12,601	Σ 3042	23 48 6	+37 29	7.0, 7.0	1906.8	87.2	4.90	5	1832.3	89.3	4.23
12,606	Ho. 204	23 48 24	+28 10	8.0, 10.2	1906.7	356.2	5.81	7	1882.9	354.8	5.82
12,610	Σ 3043	23 49 1	+38 16	8.4, 9.2	1905.0	251.6	15.95	1	1831.1	250.0	15.52
12,613	Σ 3044	23 49 8	+11 31	6.9, 7.3	1905.0	282.0	18.89	2	1831.0	282.1	18.58
12,625	Σ 3045	23 50 35	+ 2 3	7.8, 9.8	1913.9	268.8	1.37	1	1832.5	262.4	1.55
12,655	Σ 3047	23 54 5	+56 58	8.7, 8.7	1899.1	72.5	1.26	1	1832.2	65.6	1.18
12,656	Σ 3048	23 54 12	+23 56	7.7, 8.8	1904.9	314.1	9.01	2	1830.6	314.3	9.22
12,667	Ho. 206	23 55 15	+33 51	8.0, 10.0	1906.9	187.1	1.95	3	1881.7	191.1	2.09
*12,675	Σ 3050	23 55 40	+33 19	6.0, 6.0	1898.3 1904.0 12.8	212.7 215.5 222.0	2.57 2.38 2.15	12 13 3	1832.7	191.0	3.78
*12,696	Hn. 60	23 57 34	+39 13	8.5, 8.9	1908.2	297.9	0.55	1	1881.7	124.1	0.62
12,697	Ho. 208	23 57 38	+30 19	8.0, 10.0	1908.0	229.0	0.56	1	1884.4	235.8	0.67
*12,701	β 733	23 57 56	+26 42	6.0, 12.5	1894.89 95.46 98.52 1901.91	162.8 194.3 222.4 242.1	0.85 0.47 0.64 0.68	1 2 3 4	1878.73	274.0	0.67
	AC			8.5	1895.1	350.0	28.86	1	1852.7	114.1	33.03
*12,709	β 281	23 58 31	+ 1 43	7.5, 11.0	1898.0 1902.9	203.3 197.6	1.53 1.39	1 1	1877.8	217.0	1.12

NOTES
ON
DOUBLE STARS
SHOWING
RELATIVE MOTION

EACH of the stars in the preceding Catalogue has been examined for relative motion of the components. In all cases where relative motion is indicated with certainty a note is given, except for a very few well-known pairs, such as Procyon, and a few optical pairs which have previously been described as such. In these cases it did not appear desirable to make a new investigation. For some recently discovered pairs there is a considerable difference between the observations given in the present Catalogue and the discovery observations. However, as these are mostly difficult pairs, it is necessary to get observations at a third epoch to confirm the change, and for them no note is given. It should be easy to decide from the Catalogue itself and these notes which pairs are requiring observation at the present time.

The notes are based on the observations given in Burnham's *General Catalogue*, Lewis's *Memoir on the Struve Double Stars*, the present Catalogue, and observations recently published in various astronomical journals and observatory publications. A considerable number of pairs previously described as "fixed" have been found to be in slow relative motion. When motion was suspected the observed angles, and sometimes also the distances, were plotted against the time. It is believed that the motion given is real for nearly all stars.

The notes give the number in Burnham's *General Catalogue*, the common double star name, and, for the brighter stars, the Beyer letter or Flamsteed number with constellation, the Harvard Spectral Type, and the proper motion given in Boss's *Preliminary General Catalogue*, in the Publications of the Cincinnati Observatory (Porter), or the Greenwich Catalogues. These are followed by notes on the motion. The hypothetical parallaxes, p_1 , p_2 , p_3 , have been computed by means of the formulæ

$$p_1 = \frac{1.34\rho_2}{t_3^{\frac{2}{3}}} \left[\frac{\theta_3 - \theta_1}{360} \right]^{\frac{2}{3}}$$

$$p_2 = \frac{1.34\rho_2}{t_3^{\frac{2}{3}}} \left[\left(\frac{\theta_3 - \theta_1}{360} \right)^2 + \frac{2\rho_2 - \rho_1 - \rho_3}{\pi^2\rho_2} \right]^{\frac{1}{3}}$$

$$p_3 = 0.397 \sqrt[3]{\rho_2 v^2}$$

where ρ_1 , θ_1 ; ρ_2 , θ_2 ; ρ_3 , θ_3 are the observed separations (in seconds of arc) and position angles (in degrees) at three equidistant epochs, $t_0 - \frac{1}{2}t$, t_0 , $t_0 + \frac{1}{2}t$ (t counted in years), v is the annual relative motion in seconds of arc, and π is the ratio of the circumference to the diameter of a circle. For the calculation of p_2 complete observations at three epochs are required; observations at two epochs are sufficient for the calculation of p_3 ; while p_1 can be computed from a mean separation and observed change in angle only. The coefficients are so arranged that $p_1 = p_2 = p_3$ for a circular orbit.

Where the hypothetical parallax is given for a binary with orbit elements, it is calculated on the assumption that the system has twice the mass of the sun. For the trigonometrical parallaxes only the best determinations have been used. The number in brackets gives the number of determinations used. The spectroscopic parallaxes are taken from *The Parallaxes of 1646 Stars derived by the Spectroscopic Method* by W. S. Adams, A. H. Joy, G. S. Strömberg, and Cora G. Burwell.

NOTES.

12,731. Σ3056. From the measures of the star C, Burnham deduces the proper motion of AB as $0''.036$ in $205^{\circ}.7$. In the AB system the position angle has decreased $10^{\circ}.3$ in 80 years at a mean separation of $0''.58$. $p_1 = ''004$.

12,732. β862. There has probably been considerable relative motion in this pair, but the observations are discordant.

12,740. OΣ547. Spec. K2. P.M. $+0^s.0803$, $-0''.129$ (Porter). There has been a relative motion of $30^{\circ}.7$ in 40 years at $4''.44$. This is large for so faint a pair, but the large common proper motion and the late spectral type indicate that it is really orbital motion. $p_1 = ''998$. Abs. Trig. Par. $''102$ (4). Spec. Par. $''096$.

12,750. Σ3060. Spec. K0. P.M. $-0^s.0093$, $-0''.166$ (Porter). The position angle has increased $10^{\circ}.5$ in 80 years at $3''.61$. $p_1 = ''025$.

12,755. Σ3062. Spec. G5. P.M. $+0^s.0329$, $+0''.038$ (Boss). This is a well-known binary with a period of 105 years, so that considerably more than a revolution has been described since the observations of Herschel in 1782. The following is a comparison of the Greenwich observations with Lohse's orbit (*Publ. Astrophys. Obs. Potsdam*, xx, 76) :—

	Observed.	n	Obs.—Comp.
1895.11	$331^{\circ}.2$ $1''.58$	2	$-1^{\circ}.5$ $+''06$
1899.75	$340^{\circ}.9$ $1''.45$	5	$-0^{\circ}.9$ $-''11$
1913.73	$12^{\circ}.7$ $1''.68$	1	$+5^{\circ}.0$ $+''11$

The hypothetical parallax is $''051$. Abs. Trig. Par. $''036$ (1). Spec. Par. $''060$ for brighter (G4) star and $''036$ for fainter (G7) star.

70. OΣ2. Spec. F5. P.M. $-0^s.0003$, $-0''.036$ (Greenwich, 1910). The measured distances of the best modern observers give an average of $0''.64$. The early measures are somewhat larger than this, yet if the corrected position angles of OΣ are used the angular motion between 1843 and 1873 was double that between 1882 and 1912. It is probable that no correction should be applied to OΣ's angles, and that the separation about 1850 was just a little less than it is now. The position angles obtained from the observations may be represented by $53^{\circ}.3$ in 1848, $42^{\circ}.2$ in 1880, and $34^{\circ}.0$ in 1912. To get constant rate of description of area, we must take the corresponding distances as $0''.51$, $0''.60$, and $0''.68$. Perhaps the observations are best represented by uniform motion of $19^{\circ}.3$ in 64 years at $0''.64$. $p_1 = ''008$.

260. OΣ12. λ Cassiopeiæ. Spec. B8. P.M. $+0^s.0052$, $-0''.012$ (Boss). The early observations are rather uncertain. The following position angles represent the observations as well as possible, and

the distances have been supplied to suit the angular motion :—

1846	$121^{\circ}.8$	$''42$
1879	$141^{\circ}.2$	$0''.50$
1912	$154^{\circ}.7$	$0''.60$

Assuming uniform angular motion of $32^{\circ}.9$ in 66 years at $0''.50$, $p_1 = ''008$.

314. Ho. 212. 13 Ceti. Spec. G0. P.M. $+0^s.0272$, $-0''.018$ (Boss). The faint star C which forms β490 with the bright pair is only an optical member of the system. The Greenwich observations are compared below with Aitken's orbit (*Publ. Lick Obs.*, xii, 5). The period is only 6.88 years.

	Observed.	n	Obs.—Comp.
1906.88	$244^{\circ}.4$ $0''.24$	1	$-1^{\circ}.7$ $-''04$
1907.83	$245^{\circ}.0$ $0''.31$	1	$-16^{\circ}.3$ $+''01$
1908.90	$265^{\circ}.0$ $0''.25$	1	$-11^{\circ}.2$ $-''03$
1913.94	$241^{\circ}.4$ $0''.22$	3	$-7^{\circ}.4$ $-''07$

The hypothetical parallax is $''053$. Abs. Trig. Par. $''052$ (3). Spec. Par. $''042$.

322. Σ42. Spec. F8. P.M. $+0^s.0130$, $-0''.423$ (Greenwich, 1910). The angle has decreased $7^{\circ}.2$ in 75 years at $5''.60$. $p_1 = ''031$. Abs. Trig. Par. $''027$ (1).

374. OΣ18. Spec. F8. Hussey's orbit (*Publ. Lick Obs.*, v, 37) is based on an arc of only 44° . The following is a comparison of this orbit with the Greenwich observations :—

	Observed.	n	Obs.—Comp.
1901.8	$128^{\circ}.4$ $1''.07$	1	$-8^{\circ}.1$ $-''09$
1910.9	$147^{\circ}.6$ $1''.29$	1	$-0^{\circ}.6$ $+''23$

The observations of this pair may be summarised as follows :—

1846	$90^{\circ}.8$	$1''.44$
1868	$107^{\circ}.3$	$1''.42$
1890	$125^{\circ}.3$	$1''.29$
1912	$149^{\circ}.7$	$1''.08$

These figures give the following values of the hypothetical parallax :—

	p_1	p_2	p_3
1846-1890	$''032$	$''040$	$''031$
1868-1912	$''033$	$''037$	$''034$

The hypothetical parallax derived from Hussey's elements is $''024$.

426. Σ60. η Cassiopeiæ. Spec. F8. P.M. $+0^s.1390$, $-0''.522$ (Boss). There are many orbits for this binary. Lohse's orbit (*Publ. Astrophys.*

Obs. Potsdam, xx. 79) is used in the following comparison:—

	Observed.	n.	Obs.—Comp.
1898.56	217.2	5.12	2 +3.1 —.12
1902.45	225.0	5.52	4 +0.7 —.02
1911.82	243.0	6.52	2 —1.6 +.11
1914.85	252.2	6.56	2 +2.2 —.16

The hypothetical parallax derived from three recent orbits is ".168 (Dobereck), ".178 (Lewis), and ".163 (Lohse). Abs. Trig. Par. ".186 (5). Spec. Par. ".132 for the brighter (F8) star and ".151 for the fainter (K5) star.

431. β 495. Spec. G0. There is a rather uncertain decrease in the position angle of 12° in 40 years at $0''.63$. $p_1 = .008$.

440. β 232. Spec. F5. The angle has increased 45° in 20 years. The separation being only $0''.37$, $p_1 = .017$.

456. Σ 67. There has been a uniform decrease in the angle of $13^\circ.1$ in 81.4 years at a mean separation of $1''.75$. $p_1 = .014$.

479. O Σ 20. 66 Piscium. Spec. A0. P.M. $+0''.0016$, $-0''.013$ (Boss). There is an orbit of this binary by Glasenapp, but it does not satisfy recent observations, the true motion being much slower than the computed. The following positions have been deduced from all the data available, but the early observations are rather uncertain:—

1847.33	73.3	0.66
1850	70.7	0.62
1860	59.6	0.51
1870	40.1	0.40
1880	11.5	0.37
1890	344.4	0.41
1900	324.4	0.48
1910	309.9	0.54
1915	303.8	0.57

The following values of the hypothetical parallax have been computed, but p_2 is poorly determined on account of uncertainty in the variation of the distance:—

	p_1	p_2	p_3
1850–1870	.018	.014	.021
1870–1890	.019	.010	.020
1890–1910	.018	.019	.019

These give a mean of ".018. The hypothetical parallax from Glasenapp's elements is ".014.

482. Σ 73. 36 Andromedae. Spec. K0. P.M. $+0''.0100$, $-0''.033$ (Boss). A new orbit has been computed and is given later in this volume. The hypothetical parallax is ".031.

489 β 1099. Spec. B9. P.M. $+0''.0052$, $0''.000$ (Boss). The following positions show the motion from 1890 to 1910:—

1890	271.8	0.185
1895	293.9	0.190
1900	313.8	0.215
1905	328.3	0.260
1910	338.3	0.305

From these we deduce

	p_1	p_2	p_3
1890–1900	.013	.008	.014
1900–1910	.012	.012	.015

The adopted value is ".012.

508. β 302. Spec. A0. The position angle has increased from $93^\circ.0$ to $109^\circ.4$ in the 30 years to 1910. The mean separation is $0''.64$. $p_1 = .011$.

600. O Σ 515. ϕ Andromedae. Spec. B8. P.M. $+0''.0007$, $-0''.007$ (Boss). The early measures of distance are too large for the angular motion. The following are adjusted to give constant rate of description of area:—

1852	309.7	0.36
1867	292.7	0.29
1882	268.2	0.25
1897	240.0	0.245
1912	211.5	0.25

It is probable that the position of minimum separation has been passed. From the above figures we deduce values of the hypothetical parallax as follows:—

	p_1	p_2	p_3
1852–1882	.009	.006	.010
1882–1912	.010	.009	.010

The adopted value is ".009. Abs. Trig. Par. ".008 (1).

614. β 235. Spec. F5. The observations show a relative motion in the close pair of 18° in the 25 years to 1901. There are no recent observations. With a mean separation of $0''.76$, $p_1 = .016$.

714. β 4. Spec. F0. The R.A. of this star for 1925 should be $1^h 17^m 21^s$. There appears to have been a decrease in the position angle of about 13° in 30 years at $0''.40$. $p_1 = .006$.

707. Σ 113. 42 Ceti. Spec. F5. P.M. $+0''.0005$, $-0''.009$ (Boss). The position angle has increased 25° in 78 years to 1911. The mean separation is $1''.32$, $p_1 = .016$.

830. Σ 138. Spec. F8. The angle has increased uniformly $21^\circ.1$ in 81 years. With a separation of $1''.49$, $p_1 = .016$.

887. β 370. Spec. A2. There has been a decrease in the position angle of $16^\circ.5$ in 20 years at $1''.14$. $p_1 = .026$.

900. β 509. Spec. K0. The position angle has decreased $24^\circ.0$ in 30 years at $0''.74$. $p_1 = .017$.

898. Σ 149. Spec. F5. Decrease in angle of $21^\circ.5$ in 75 years at $1''.33$. $p_1 = .015$.

926. Σ 158. Spec. F8. There has been an increase of $10^\circ.0$ in the angle in 75 years at $2''.05$. $p_1 = .014$.

946. $\beta 510$. Spec. F2. The observations are not very consistent, but show a retrograde motion of about 8° in 30 years at $1''.62$. $p_1 = ".018$.

941. $\Sigma 162$. Spec. A2. The angle has decreased $13^\circ.2$ in 84 years at $1''.90$. $p_1 = ".015$.

981. $\Sigma 178$. Spec. F0. The angle has increased $5^\circ.1$ in 80 years at $3''.18$. $p_1 = ".013$.

992. $\beta 260$. Spec. F5. The angle has increased $10^\circ.4$ in 30 years at $0''.68$. $p_1 = ".009$.

1002. $\Sigma 183$. Spec. F2. P.M. $+0^s.0006$, $-0^s.027$ (Greenwich, 1910). The angle has decreased $31^\circ.9$ in 80 years at $0''.55$. $p_1 = ".008$.

1015. $\Sigma 186$. Spec. G0. P.M. $+0^s.0105$, $+0^s.182$ (Boss). The observations are compared with van Biesbroeck's orbit (*Ann. de l'Obs. Roy. de Belg.*, ix. 95):—

	Observed.	n.	Obs.—Comp.
1902.9	28.0	0.46	4 +0.5 —.04
1907.9	34.3	0.66	3 +1.4 —.12
1912.2	36.1	0.94	3 +0.7 —.05

The hypothetic parallax from van Biesbroeck's elements is $".028$. Abs. Trig. Par., $".047$ (1).

1039. $\Sigma 194$. Spec. A3. P.M. $-0^s.0006$, $-0^s.024$ (Greenwich, 1910). The observations are not in very good agreement, but show an increase in the position angle of $8^\circ.5$ in 80 years at $1''.19$. $p_1 = ".007$.

1061. $\Sigma 202$. α Piscium. Spec. A2p. P.M. $+0^s.0028$, $-0^s.006$ (Boss). The motion may be represented by

1830	333.9	3.65
1872	324.9	3.15
1914	311.5	2.44

These positions give $p_1 = ".035$, $p_2 = ".048$, $p_3 = ".043$. Adopt $".042$.

1070. $O\Sigma 38$. γ Andromedæ. Spec. K0 (star A, magnitude 2.28), A0 (stars BC, magnitude 5.08). P.M. $+0^s.0042$, $-0^s.052$ for A and $+0^s.0041$, $-0^s.055$ for BC (Boss). The AB components form $\Sigma 205$, and show no certain relative motion. The BC components form $O\Sigma 38$, and are in rapid motion. Hussey's orbit, with which the observations are compared below, gives the period as only 55.0 years, and this must be very nearly correct.

	Observed.	n.	Obs.—Comp.
1898.2	120.5	0.30	8 +3.5 —.02
1901.9	115.8	0.39	11 +1.3 —.05
1909.5	115.5	0.40	9 +4.1 —.17
1914.3	115.4	0.45	5 +5.5 —.15

The hypothetical parallax from Hussey's elements is $".019$. Abs. Trig. Par., $".010$ (4). Spec. Par., $".033$.

1074. $\Sigma 208$. ι Arietis. Spec. F5. P.M. $+0^s.0102$, $+0^s.016$ (Boss). This pair has been discussed by Doolittle. A.J. 746. It is clearly a real binary, and the orbital motion is now rapid. When the observations are tested for constancy in the rate of description of area it appears that Struve's measured distances are rather large. This is the reason why the motion has been considered rectilinear for so long. The positions given below show decided curvature before 1900.

1830	24.0	1.78
1845	28.7	1.64
18.0	34.4	1.46
1875	42.2	1.23
1890	53.7	0.98
1899	64.6	0.77
1908	84.2	0.55
1917	119.1	0.43

Recent observations, which are not in good agreement, are as follows:—

1910.8	99.1	0.29	Gr. Obs.	5
1911.3	92.1	0.40	A	3
1912.1	89.0	0.39	J	1
1912.4	95.3	0.5	Dob.	3-1
1913.9	129.1	0.25	Gr. Obs.	2
1914.9	103.6	0.20	J	2
1915.8	112.8	0.38	A	1
1917.0	117.1	0.35	A	1

If the position angle is as small as indicated by the latest observations, the distance can never have been so small as $0''.4$. The pair is difficult, but is well worth observation, as the motion is very rapid.

The hypothetical parallax is derived as follows:—

	p_1	p_2	p_3
1830-1890	.024	.033	.030
1899-1917	.030	.018	.034

The adopted value is $".028$.

1137. $\Sigma 227$. ι Trianguli. Spec. G0. P.M. $-0^s.0048$, $-0^s.062$ (Boss). The position angle has decreased about $5^\circ.6$ in the 80 years to 1910. Separation, $3''.70$. $p_1 = ".017$.

1144. $\Sigma 228$. Spec. F0. P.M. $-0^s.0072$, $-0^s.075$ (Bossert). A new orbit has been computed and is given in a later part of the volume. The elements give a hypothetical parallax of $".026$. Abs. Trig. Par., $".075$ (1). Spec. Par., $".025$.

1212. $\Sigma 248$. The position angle has decreased $14^\circ.7$ in 80 years to 1910. Separation, $1''.50$. $p_1 = ".013$.

1224. $\Sigma 254$. This is clearly an optical pair. Burnham finds a relative motion of $0^s.051$ in 270° annually.

1235. $\Sigma 257$. Spec. B8. This is now a difficult pair, showing rapid orbital motion. Observations are neither numerous nor accordant, especially between 1870 and 1900, when the motion commenced to be rapid. In 1915 the angle observed was $268^\circ.2$ —an increase of over 100° since 1830. The follow-

ing positions show the nature of the motion, but the data are rather unreliable:—

1830	165.5	0.57
1850	176.2	0.60
1870	188.5	0.49
1880	197.4	0.42
1890	209.9	0.35
1900	227.4	0.30
1910	249.4	0.28
1915	262	0.28

These give the hypothetical parallax as follows:—

	p_1	p_2	p_3
1830-1870	.011	.021	.011
1870-1890	.012	.012	.014
1890-1910	.012	.007	.013

1299. OΣ42. Spec. A2. P.M.—0^s.0008, —0^s.007 (Boss). It is very difficult to say anything very definite about this pair. Recent measures show an increase in the position angle of 20° or 30° since the measures at the time of discovery. The separation seems to be much smaller and now only about 0^s.2. It is therefore impossible to attach any meaning to the observed changes in position angle. Only measures made under good conditions with a large refractor appear to be useful.

1346. Σ285. Spec. Ko. The angle has decreased 8°·0 in 80 years at 1^s.83. $p_1 = \text{''}010$.

1365. OΣ43. Spec. F5. P.M.+0^s.0024, +0^s.014 (Greenwich, 1910). The following positions show the motion:—

1846	93.5	0.57
1868	67.3	0.75
1890	51.8	0.96
1912	41.8	1.14

These give

	p_1	p_2	p_3
1846-1890	.019	.017	.022
1868-1912	.018	.021	.022

1386. Σ295. 84 Ceti. Spec. F5. P.M.+0^s.0140, —0^s.136 (Boss). The position angle has decreased 18°·5 in 80 years at 4^s.65. $p_1 = \text{''}046$. Spec. Par., $\text{''}036$.

1405. Σ300. Spec. Fo. P.M.—0^s.0020, —0^s.009 (Greenwich, 1910). The angle has increased 8°·5 in 80 years at 3^s.00. $p_1 = \text{''}018$.

1420. β83. Spec. F2. The angle has decreased 25°·0 in 40 years at 1^s.00. $p_1 = \text{''}019$.

1427. Σ305. Spec. Go. P.M.+0^s.0066, —0^s.149 (Porter). The following positions satisfy the observations very well:—

1830	330.4	1.54
1845	325.0	2.06
1860	321.7	2.44
1875	319.2	2.73
1890	317.0	2.92
1905	315.1	3.04

As the motion is now very slow, numerous observations are not necessary.

	p_2	p_3
1830-1860	.056	.050
1875-1905	.055	.030

1445. Σ310. Spec. A2. The angle has increased 10°·3 in 80 years at 2^s.64. $p_1 = \text{''}018$.

1459. Σ314. Spec. B9. The angle has increased 8°·2 in 80 years at 1^s.56. $p_1 = \text{''}009$.

1471. β524. 20 Persei. Spec. Fo. P.M.+0^s.0047, —0^s.082 (Boss). The Greenwich observations are discordant. They do not agree well with those made at Lick with a power of 1500 on the 36-inch refractor. See *Publ. Lick. Obs.*, xii. 20, where an orbit is given by Aitken. Hypothetical parallax, $\text{''}012$. Abs. Trig. Par., $\text{''}013$ (2). Spec. Par., $\text{''}022$.

1487. Σ325. An optical pair.

1501. β1173. Spec. Ko. The position angle has increased 19° in 20 years at 0^s.17. $p_1 = \text{''}004$.

1508. β525. Spec. A3. P.M.+0^s.0041, —0^s.015 (Boss). There has been a nearly uniform change from 99°·6 to 152°·0 in the 30 years 1880-1910. Mean separation=0^s.28. $p_1 = \text{''}011$.

1512. Σ333. ε Arietis. Spec. A2. P.M.—0^s.0011, —0^s.008 (Boss). The change has been mostly in distance, as follows:—

1830	0.52
1845	0.82
1860	1.03
1875	1.17
1890	1.27
1905	1.35

During the same interval there has been an increase of about 12° in the position angle. Half of this took place in the first 20 years. For 1830-1860, $p_3 = \text{''}024$, and for 1860-1905, $p_3 = \text{''}016$.

1517. Σ334. Spec. Fo. The position angle has decreased 7°·2 in 80 years. Separation, 1^s.50. $p_1 = \text{''}008$.

1526. OΣ49. Spec. Ao. There may have been a decrease in the angle, but the change is doubtful.

1559. Σ346. 52 Arietis. Spec. B8. P.M.+0^s.0003, —0^s.014 (Boss). The position angle has increased 7°·2 in 80 years at 0^s.49. $p_1 = \text{''}003$.

1584. β1030. Spec. Fo. The position angle has decreased 17°·0 in 20 years at 0^s.57. $p_1 = \text{''}014$.

1594. $\Sigma 360$. Spec. Go. The motion is shown by

1830	147 ^o .0	1 ^{''} .34
1870	139.3	1.67
1910	134.0	1.95

This gives $p_1 = ".013$.

1598. $O\Sigma 51$. Spec. Go. The angle has increased $9^{\circ}.2$ in 60 years at $1''.30$. $p_1 = ".010$.

1623. $\Sigma 367$. Spec. F8. There are not many observations of this pair, and as the angular motion has now reached $1^{\circ}.5$ per annum, it is requiring observation. There is an orbit by Glasenapp showing a period of 224 years, but as only about 80° have been described since Struve's observations, the orbit is still uncertain. A combination of all the observations give the following positions:—

1830	282 ^o .6	0 ^{''} .94
1840	275.6	0.93
1850	268.2	0.90
1860	260.3	0.87
1870	251.9	0.83
1880	242.4	0.77
1890	231.3	0.71
1900	218.3	0.66
1910	203.4	0.62

Whence

	p_1	p_2	p_3
1830-1870	".020	".023	".020
1870-1910	.021	.020	.022

The Abs. Trig. Par. is $".032$ (1).

1640. $\beta 34$. Spec. B9. The observations are too discordant for any conclusion to be drawn as to the relative motion.

1639. $O\Sigma 53$. Spec. Go. About 60° of the orbit have been described in 70 years, and the angular motion is now about 2° per annum, so that this pair deserves regular observation. Observations in the past have not been very numerous. Maximum separation appears to have been reached between 1860 and 1870, if we rely on the measures of angle. The following positions indicate the motion:—

1840	(280 ^o .6)	(0 ^{''} .64)
1850	272.3	0.84
1860	266.3	0.92
1870	260.9	0.93
1880	255.2	0.88
1890	248.0	0.75
1900	236.5	0.58
1910	217.4	0.42

From these positions we find

	p_1	p_2	p_3
1850-1870	".017	".034	".018
1870-1890	.017	.035	.021
1890-1910	.020	.019	.026

1678. $\Sigma 380$. Spec. Go. The angle has decreased from $90^{\circ}.5$ in 1830 to $60^{\circ}.8$ in 1910. The mean separation during that interval was $1''.17$, but it is probable that it is decreasing slowly with an acceleration of the angular motion. $p_1 = ".016$.

1761. $\Sigma 412$. γ Tauri. Spec. A2. A new orbit has been computed and is given later. Hyp. Par., $".009$.

1774. $\beta 533$. Spec. Fo. P.M. $+0^s.0043$, $-0''.020$ (Greenwich, 1910). The following angles are probably fairly accurate, and the distances have been adjusted to fit:—

1880	63 ^o .0	0 ^{''} .34
1895	51.7	0.50
1910	45.8	0.65

These give $p_1 = ".009$.

1799. $\Sigma 425$. Spec. F5. When the observed angles are plotted against the time, and a smooth curve drawn, we get:—

$$1830, 104^{\circ}.6; 1869, 100^{\circ}.0; 1908, 89^{\circ}.1.$$

The decrease in distance during the same interval has only been from about $2''.9$ to $2''.4$. These figures do not give anything approximating to a constant rate of description of area, although the angular speed is increasing and the separation decreasing. Assuming a decrease in the angle of $12^{\circ}.6$ in the 60 years 1845-1905 at a mean distance of $2''.60$, we find $p_1 = ".024$.

1834. $\beta 535$. α Persei. Spec. B1. P.M. $+0^s.0008$, $-0''.024$ (Boss). The angle is decreasing, but the rate is uncertain, say a change of $13^{\circ}.6$ in 35 years at $0''.97$. $p_1 = ".014$.

1856. $\beta 536$. Spec. A3. This will probably prove a short-period binary. See *Publ. Lick. Obs.*, xii. 25.

1900. $O\Sigma 65$. Spec. A β . P.M. $+0^s.0029$, $-0''.108$ (Boss). This is probably a binary, with the plane of the orbit nearly parallel to the line of sight.

1983. $\Sigma 476$. Spec. K2. An optical pair.

2007. $\Sigma 483$. Spec. G5. P.M. $+0^s.0165$, $-0''.060$ (Porter). There are comparatively few observations of this pair, although it has been worthy of careful observation since 1890, when it became fairly close. The separation has decreased from $2''.8$ in Struve's time to less than $0''.5$. It is again increasing, but probably will not increase beyond $1''.0$ before a maximum is reached. The following positions were deduced from smooth curves drawn through the observed values of position angle and distance plotted against the time. The value of $r_1 r_2 d\theta$ are given for 15 year intervals:—

			$r_1 r_2 d\theta$
1830	11.7	2 ^{''} .80	
1845	7.9	2.57	27.4
1860	2.7	2.09	27.9
1875	354.5	1.37	23.4
1890	336.2	0.75	18.8
1895	318.5	0.56	22.3
1900	282.5	0.45	27.3
1905	230.5	0.44	30.9
1910	193.5	0.60	29.3
1915	180	0.80	19.4

The best determinations of $r_1 r_2 d\theta$ should be between 1860 and 1895, when the angular motion and the separation were both reasonably large. It is probable, therefore, that the angular motion before 1860 was less than that given above, and that the minimum distance between 1900 and 1905 was about $0''.36$. The following positions give a nearly constant rate of description of area :—

1830	11.1	2.80
1845	7.8	2.44
1860	3.1	1.95
1875	354.8	1.38
1890	334.0	0.78
1895	317.0	0.55
1900	280.0	0.37
1905	230.0	0.40
1910	200.0	0.61
1915	183.0	0.72

It is not unlikely that the separation will remain at a nearly constant value of $0''.8$ or $0''.9$ for the next 50 years while the second quadrant is being described. The values of the hypothetical parallax deduced from the above are :—

	p_1	p_2	p_3
1830-1860	.027	.061	.052
1860-1890	.036	.039	.055
1890-1900	.045	.037	.051
1900-1910	.042	.018	.051

Spec. Par., ".029.

2027. O Σ 531. Spec. G5. P.M. + $0^s.0153$, - $0''.224$ (Boss). The observed angular speed has remained nearly constant, while the observed distance has decreased from $3''.3$ to $1''.4$. These are quite inconsistent. The following positions may approximately represent the motion :—

1854	146.6	3.28
1874	141.2	2.83
1894	133.2	2.23
1914	119.0	1.59

These give

	p_1	p_2	p_3
1854-1894	.036	.061	.055
1874-1914	.040	.032	.058

2034. Σ 493. Spec. F8. There has been a decrease of 7° in the position angle in 80 years at $1''.68$. $p_1 = ".009$.

2041. Σ 3114. Spec. F8. P.M. - $0^s.0037$, - $0''.109$ (Porter). The angle has decreased $22^\circ.5$ in 80 years at a mean separation of $2''.30$. It is possible that the separation is increasing. $p_1 = ".026$.

2050. Ho. 326. Spec. Go. P.M. + $0''.0014$, - $0''.089$ (Greenwich, 1910). Extraordinarily concordant observations show motion of $25^\circ.3$ in 23 years at $0''.34$. $p_1 = ".010$.

2093. O Σ 77. Spec. F8. P.M. - $0^s.0006$, - $0''.050$ (Greenwich, 1910). A new orbit has been computed giving a hypothetical parallax of ".017.

2115. Σ 520. Spec. F5. The position angle has increased $18^\circ.3$ in 80 years at $0''.86$. $p_1 = ".009$.

2134. O Σ 79. 55. Tauri. Spec. Go. P.M. + $0^s.0076$, - $0''.03$ (Bossert). The recent measures made at Greenwich do not agree well with those made at Lick and Dearborn Observatories. A comparison with Aitken's orbit (*Publ. Lick. Obs.*, xii. 30) gives :—

	Observed.	n.	Obs.—Comp.
1899.07	241.5	0.39	1 + 7.1 +.17
1913.64	306.4	0.33	3 - 21.7 -.03

The hypothetical parallax of Aitken's orbit is ".023. Spec. Par., ".023.

2146. O Σ 80. Spec. B9. The angle is decreasing, but the rate is rather uncertain, say, $12^\circ.0$ in 60 years at $0''.57$. $p_1 = ".005$.

2154. O Σ 82. Spec. Go. P.M. + $0^s.0066$, -".004 (Weersma). If accurate observations of this pair were obtained at the present epoch it would be possible to effectively check the orbit given by Hussey in 1900 (*Publ. Lick. Obs.*, v. 60). Although the separation in 1912 was at least $0''.6$, there are large discordancies in the observations—probably resulting from the considerable inequality in the brightness of the components. The following ephemeris is deduced from Hussey's elements :—

1900	125.8	0.653
1905	108.9	0.643
1910	92.1	0.658
1915	76.3	0.683
1920	61.5	0.693
1925	46.0	0.639
1930	22.9	0.450

There appears to be an error in the comparison ephemeris used by Aitken (*Publ. Lick. Obs.*, xii. 31). We compare below recent observations with the ephemeris :—

	Observed.	Obs.—Comp.		
1899.52	123.6	0.80	-3.8	+1.4 A 2
1899.60	128.5	0.49	+1.4	-17 Gr. Obs. 5
1900.59	125.4	0.64	+1.6	-01 Hu. 1
1906.35	102.2	0.62	-2.1	-03 A 2
1908.90	93.5	0.60	-2.2	-05 A 3
1912.04	78.5	0.62	-7.1	-05 A 2
1912.42	88.3	0.72	+4.1	+05 Fox 2
1912.44	93.3	0.62	+9.2	-05 Gr. Obs. 8
1914.77	77.6	0.72	+0.5	+04 Lv. 1

The hypothetical parallax of Hussey's orbit is ".035. Spec. Par., ".024.

2161. Σ 535. Spec. A2. The motion is shown by :—

1830	352.3	1.96
1851	346.1	1.85
1872	339.2	1.74
1893	331.2	1.62
1914	321.6	1.47

Whence we find $p_1 = ".023$, and $p_3 = ".025$.

2163. O Σ 81. 56 Persei. Spec. F5. P.M. + $0^s.0035$, - $0''.082$ (Boss). When the observed angles are plotted against the time we find an increase in the angular motion. The measured distances show no decrease. We, therefore, take the angular motion as uniform, amounting to $18^\circ.0$ in 60 years at a mean separation of $4''.50$. This gives $p_1 = ".053$.

2172. Hu. 304. 66 Tauri. Spec. A2. P.M. $-0^s.0019$, $-0^s.007$ (Boss). The few measures so far made are very consistent. They show an angular motion of $15^{\circ}.7$ in 10.2 years at $0^s.30$. $p_1 = ^s.011$.

2200. $\Sigma 546$. Spec. G0. P.M. $+0^s.0062$, $-0^s.137$ (Boss). There appears to be a definite decrease in angle of $4^{\circ}.4$ in 80 years at $6^s.82$. $p_1 = ^s.026$.

2255. $\Sigma 562$. Spec. F2. The angle is increasing, but the observations are not very accordant—say, 10° in 80 years at $2^s.0$. $p_1 = ^s.013$.

2270. $O\Sigma 86$. Spec. A2. The position angle has changed uniformly from $80^{\circ}.7$ in 1845 to $58^{\circ}.5$ in 1910. Mean separation, $0^s.53$. $p_1 = ^s.007$.

2272. $\Sigma 567$. Spec. G0. The observed angles are well represented by the following positions, but the measures of distance are not sufficiently reliable to deduce the distances accurately, although they show considerable increase:—

1830	$302^{\circ}.7$	$1^s.38$
1870	$314^{\circ}.7$	$1^s.70$
1910	$322^{\circ}.8$	$2^s.04$

These give $p_1 = ^s.018$, $p_3 = ^s.023$.

2274. $\Sigma 565$. Spec. K0. There has been a decrease of a few degrees in the position angle from Struve's observations.

2284. $\Sigma 572$. Spec. F0. P.M. $+0^s.0024$, $-0^s.060$ (Greenwich, 1910). The angle has decreased $10^{\circ}.6$ in the 80 years to 1910. The mean separation was $3^s.54$. It is probable that the angular motion has decreased and that the separation has increased. $p_1 = ^s.024$.

2279. $\Sigma 566$. (AB, C). $\beta 1295$ (AB). 2 Camelopardali. Spec. F0. P.M. $+0^s.0075$, $-0^s.090$ (Boss). The position angle of the Σ pair has decreased $27^{\circ}.0$ in 80 years at a mean separation of $1^s.60$. $p_1 = ^s.020$. Abs. Trig. Par. $^s.025$ (1).

2307. $\Sigma 577$. Spec. F8. Struve's angles appear to be a degree or two too large compared with those of other early observers. However, the separation appears to have altered very little, and Struve's angles fit in well with observations since 1860 if constant angular motion is assumed. We might adjust the observations to show angles of $97^{\circ}.3$ in 1830 and $64^{\circ}.2$ in 1910, giving a relative motion of $33^{\circ}.1$ in 80 years. The mean separation was $1^s.55$, giving $p_1 = ^s.023$.

2336. $\Sigma 589$. Spec. G5. The position angle has decreased $17^{\circ}.1$ in 80 years at $4^s.54$. Mean separation, $4^s.54$. $p_1 = ^s.043$.

2381. $\beta 883$. Spec. F5. The following is a comparison of the Greenwich observations with Aitken's orbit (*Publ. Lick. Obs.*, xii. 35):—

	Observed.	n.	Obs.—Comp.
1897.00	$25^{\circ}.5$	1	$-2^{\circ}.3$
1897.31	$39^{\circ}.6$	1	$+8^{\circ}.7$
1898.08	$37^{\circ}.7$	7	$-0^{\circ}.6$
1899.08	$49^{\circ}.9$	7	$+2^{\circ}.4$
1900.12	$61^{\circ}.6$	12	$+4^{\circ}.3$
1901.10	$60^{\circ}.0$	5	$-7^{\circ}.0$
1902.00	$73^{\circ}.2$	5	$-4^{\circ}.0$
1903.05	$90^{\circ}.9$	3	$0^{\circ}.0$
1904.04	$105^{\circ}.8$	1	$-1^{\circ}.8$
1910.07	$341^{\circ}.2$	3	$-0^{\circ}.6$
1913.06	$25^{\circ}.2$	4	$+2^{\circ}.9$
1914.06	$33^{\circ}.4$	1	$+1^{\circ}.2$
1915.22	$50^{\circ}.3$	2	$+7^{\circ}.2$

The hypothetical parallax of Aitken's orbit is $^s.023$. Abs. Trig. Par., $^s.024$ (3). Spec. Par., $^s.024$.

There is a motion of C relative to AB of $3^s.0$ in 255° in the 25 years 1879–1904. This is due to the difference in proper motions.

2383. $\beta 552$. Spec. F5. New orbit computed and given later. The hypothetical parallax is $^s.025$. Abs. Trig. Par. $^s.007$ (1). Spec. Par. $^s.028$.

2443. $\Sigma 622$. Spec. F5. The angle has decreased 10° in 80 years at $2^s.47$. $p_1 = ^s.016$.

2445. $O\Sigma 92$. 5 Aurigæ. Spec. F5. P.M. $-0^s.0011$, $+0^s.003$ (Boss). The following positions fit the measures fairly well, although the measures do not justify such a large change in distance:—

1845	$229^{\circ}.8$	$2^s.60$
1875	$244^{\circ}.2$	$2^s.82$
1905	$256^{\circ}.5$	$3^s.04$

$p_1 = ^s.044$, $p_3 = ^s.045$. Abs. Trig. Par., $^s.002$ (1). Spec. Par., $^s.020$.

2446. $\Sigma 619$. Spec. G. The angles plotted against the time show a nearly uniform increase, but the distance has been decreasing. The following positions show the motion:—

1830	$105^{\circ}.9$	$5^s.40$
1870	$115^{\circ}.2$	$4^s.96$
1910	$126^{\circ}.2$	$4^s.52$

These give $p_1 = ^s.053$, $p_3 = ^s.058$.

Burnham describes this as probably an optical pair. A parallax determination should be made.

2464. $O\Sigma 93$. Spec. G5. Although the distance measures are not very satisfactory, the following positions may represent the motion fairly well:—

1845	$67^{\circ}.3$	$1^s.15$
1875	$58^{\circ}.6$	$0^s.96$
1905	$43^{\circ}.7$	$0^s.66$

These give $p_1 = ^s.014$, $p_3 = ^s.018$.

2466. $\Delta 6$. Spec. A5. There appears to have been an increase of 7° in the position angle in 35 years from 1875. Separation, $1^s.00$. $p_1 = ^s.009$.

2509. $\Sigma 95$. Spec. A2. The angle has decreased $25^{\circ}.4$ in 60 years at $0^{\circ}.76$. $p_1 = ".011$.

2535. $\Sigma 98$. 14 Orionis. Spec. Fop. P.M. $+0^{\circ}.0017$, $-0^{\circ}.061$ (Boss). The observations may be combined to give the following positions:—

1852	246.0	1.25
1867	228.4	1.14
1882	206.7	1.03
1897	180.7	0.96
1912	151.8	0.92

	p_1	p_2	p_3
1852-1882	.036	.036	.037
1882-1912	.038	.036	.038

Abs. Trig. Par., $".022$ (1). Spec. Par., $".017$.

2544. $\beta 1047$. (BC), $\Sigma 645$ (AB). Spec. A3. P.M. $+0^{\circ}.0034$, $-0^{\circ}.057$ (Greenwich, 1910). More observations of the close Burnham pair are required. There is a single observation by Leavenworth in 1914. The angular motion is about $1^{\circ}.67$ per annum for the 25 years 1889-1914. Separation, $0^{\circ}.33$. $p_1 = ".013$.

2588. $\Sigma 517$. Spec. A2, G. The observations are not accordant. They indicate an increase in angle of about 34° in 60 years at $0^{\circ}.4$. $p_1 = ".007$.

2613. $\Sigma 670$. Spec. B3. The position angle has decreased $6^{\circ}.4$ in 80 years at $2^{\circ}.35$. $p_1 = ".012$.

2609. $\Sigma 657$. Spec. F5. Apparently the angular motion is increasing and the distance decreasing, but the decrease in distance is not sufficient to account for the observed change in angular speed. The following table is deduced from the observations, but does not give constant rate of description of area:—

	p_1	p_2	p_3
1830	273.2	1.41	
1870	278.5	1.25	
1910	286.6	1.08	

These figures give $p_1 = ".010$, $p_3 = ".013$.

2706. Winnecke 2. Spec. F5. P.M. $-0^{\circ}.0057$, $-0^{\circ}.02$ (Bossert). The angle appears to have decreased about $9^{\circ}.7$ in 50 years while the separation has increased from $1^{\circ}.45$ to $2^{\circ}.1$. $p_1 = ".016$, $p_3 = ".028$.

2712. Da. 5. η Orionis. Spec. B1. P.M. $+0^{\circ}.0004$, $+0^{\circ}.001$ (Boss). The angle is probably decreasing, but the rate is uncertain.

2731. $\Sigma 712$. Spec. B9. P.M. $-0^{\circ}.0001$, $+0^{\circ}.001$ (Boss). There may have been a change of 13° in 130 years. Struve's angles may be about 3° too small. Burnham considers that Struve's angles are 10° too small and that there has been no relative motion. The angles are certainly very discordant for so wide a pair. Separation, $2^{\circ}.96$. $p_1 = ".017$.

2751. $\Sigma 716$. 118 Tauri. Spec. A0. P.M. $+0^{\circ}.0015$, $-0^{\circ}.034$ (Boss). There has been an increase in angle of $9^{\circ}.0$ in 130 years at $4^{\circ}.91$. $p_1 = ".022$.

2780. $\Sigma 728$. 32 Orionis. Spec. B5. P.M. $+0^{\circ}.0008$, $-0^{\circ}.036$ (Boss). The measures of this pair have been very discordant since 1900. This was only to be expected by reason of the inequality and the closeness of the components. The following positions have been adjusted to give constant rate of description of area:—

1830	212.0	1.04
1845	206.6	0.94
1860	199.8	0.82
1875	190.5	0.68
1890	175.7	0.52
1896	165.5	0.43
1902	150.0	0.32
1908	122.5	0.26
1914	89.3	0.24

Accurate measures at the present time are urgently required.

It is probable that the whole of the first quadrant will be described in about 20 years, with the separation slowly increasing to $0^{\circ}.3$. The fourth quadrant will thereafter be described more slowly with the separation steadily increasing to perhaps $0^{\circ}.5$ or $0^{\circ}.6$ in 50 years. The period is not likely to be less than 300 years.

	p_1	p_2	p_3
1830-1860	.014	.019	.018
1860-1890	.016	.018	.020
1890-1902	.019	.023	.024
1902-1914	.020	.016	.021

2790. $\Sigma 731$. Spec. A0. The Dec. for 1925 should be $-2^{\circ} 9'$. There has been very little relative motion. The position angles given in Lewis's *Memoir* are wrong. This pair is confused with $\Delta 8 = \beta G.C. 2768$.

2812. $\beta 1267$. Spec. F5. P.M. $+0^{\circ}.0000$, $-0^{\circ}.043$ (Greenwich, 1910). The position angle has decreased $5^{\circ}.8$ in 18.2 years at $0^{\circ}.80$. $p_1 = ".010$.

2826. $\Sigma 736$. Spec. F8. The angle has increased $9^{\circ}.4$ in 80 years. Separation, $2^{\circ}.25$. $p_1 = ".014$.

2835. $\Sigma 742$. Spec. F8. The angle has increased $14^{\circ}.0$ in 80 years at $3^{\circ}.40$. $p_1 = ".028$.

2845. $\Sigma 749$. Spec. B8. P.M. $+0^{\circ}.0010$, $-0^{\circ}.030$ (Boss). The angle has decreased from $23^{\circ}.4$ in 1830 to $347^{\circ}.0$ in 1910. The mean separation was $0^{\circ}.84$. It is possible that the separation is increasing slowly and that the angular motion falling off, as is shown by:—

1830	23.4	0.76
1870	3.6	0.84
1910	347.0	0.91

This gives $p_1 = ".013$, $p_2 = ".014$, $p_3 = ".013$.

2857. β 1240. 26 Aurigæ. Spec. Az. P.M. $-0^s.0010, -0''.009$ (Boss). The observations can probably best be represented by uniform angular motion from $350^\circ.0$ in 1892 to $302^\circ.0$ in 1915 at a separation of $0''.21$. The Struve companion belongs to the system. The close pair is deserving of careful observation with large refractors. $p_1 = ''009$.

2866. O Σ 112. Spec. B9. The angle decreased $22^\circ.2$ in the 70 years to 1913. The mean separation was $0''.64$. $p_1 = ''008$.

2883. β 1032. σ Orionis. Spec. Bo. P.M. $0^s.0000, +0''.001$ (Boss). This is the principal star of Struve's triple system Σ 762. There has been a decrease in the position angle of $31^\circ.5$ in 15 years to 1905. The mean separation was $0''.23$. It is possible that the angular motion is decreasing. $p_1 = ''010$.

2896. β 1007. 126 Tauri. Spec. B3. P.M. $+0^s.0009, -0''.028$ (Boss). It is difficult to make any definite conclusion about this close pair. See Aitken, *Publ. Lick. Obs.*, xii. 42.

2902. Σ 774. ζ Orionis. Spec. Bo. P.M. $+0^s.0005, -0''.007$ (Boss). The observations are not very accordant, but they indicate an increase in angle of about 9° in 80 years. Separation, $2''.60$. $p_1 = ''016$. Abs. Trig. Par., $-''015$ (1).

2975. O Σ 119. Spec. F8. The position angle has increased about $20^\circ.5$ in 60 years at $0''.67$. $p_1 = ''009$.

2976. Σ 795. 52 Orionis. Spec. A3. P.M. $+0^s.0004, -0''.023$ (Boss). The position angle has increased 7° in 80 years at $1''.54$. $p_1 = ''008$.

2977. β 560. Spec. A5. P.M. $-0^s.0006, -0''.016$ (Greenwich, 1910). If the position angle observed in 1877 is correct, the separation was much too large. The angular motion is certainly decreasing. The following positions may approximately represent the motion, but as there were no observations between 1877 and 1889, the results are very doubtful. The distances have been adjusted to give a constant rate of description of area:—

1878	207.6	0.45
1894	171.8	0.60
1910	151.8	0.80

Assuming uniform motion at $0''.60$, $p_1 = ''023$.

3003. Σ 799. Spec. B8. The angle has decreased $14^\circ.4$ in 80 years at $0''.96$. $p_1 = ''008$.

3035. O Σ 122. Spec. A5. The observations are discordant, but an increase in the position angle of about 30° in 60 years is probable. Separation, $0''.29$. $p_1 = ''005$.

3065. Σ 821. Spec. B9. P.M. $-0^s.0042, -0''.013$ (Greenwich 1910). The angle has decreased $8^\circ.0$ in 80 years at $2''.08$. $p_1 = ''012$.

3085. Σ 826. Spec. B9. In the 60 years to 1890 there was an increase in the position angle of 11° at a separation of $2''.08$. $p_1 = ''018$.

3146. Σ 840. Spec. Ao. The few observations that have been made indicate angular motion at the rate of 16° in 80 years. Separation, $0''.71$. $p_1 = ''006$.

3148. O Σ 132. Spec. Az. The position angle has increased about 9° in 60 years at $1''.66$. $p_1 = ''012$.

3174. Σ 851. Spec. Ao. There has been an increase in the position angle of $4^\circ.2$ in 80 years at $2''.80$. $p_1 = ''010$.

3191. β 1058. 4 Geminorum. Spec. B9. In 25 years from 1889 the position angle has decreased $19^\circ.0$ at $0''.30$. $p_1 = ''007$.

3239. β 1008. η Geminorum. Spec. Ma. P.M. $-0^s.0045, -0''.017$ (Boss). The angle is probably decreasing, but measures are discordant. Abs. Trig. Par., $''016$ (3). Spec. Par., $''014$.

3291. β 895. Spec. A3. P.M. $+0^s.0018, -0''.031$ (Greenwich, 1910). This binary is the principal component of Σ 888. The position angle increased from $143^\circ.4$ in 1890 to $168^\circ.7$ in 1905, the mean separation being about $0''.23$. $p_1 = ''009$. Abs. Trig. Par., $''005$ (1). This pair deserves careful attention, for the observations which exist seem to indicate that the period 1890–1905 covered the time of maximum separation. The most recent Greenwich observations show a position angle of $189^\circ.7$ for 1913.5. The early observations, though very scanty, may indicate a minimum separation with large angular motion about 1875. Abs. Trig. Par., $''006$ (1).

3277. Σ 881. 4 Lynceis. Spec. Az. P.M. $+0^s.0003, +0''.006$ (Boss). There has been an increase in the position angle of $22^\circ.0$ in 80 years at $0''.85$. $p_1 = ''010$.

3313. O Σ 137 rej. Spec. Ao. P.M. $-0^s.0066, 0''.000$ for A (Bossert). The star B shows no motion relative to A, but if Maedler's observation is correct, C is an optical member of the system moving, relative to B, $0''.078$ in 180° per annum.

3379. Σ 905. Spec. Ao. The position angle has increased 8° in 80 years at $2''.00$. $p_1 = ''011$.

3402. Σ 919. 11 Monocerotis. Spec. B2p. P.M. $-0^s.0025, +0''.002$ (Boss). There appears to be an increase in the position angle of the BC components of $4^\circ.5$ in 80 years at $2''.58$. $p_1 = ''010$.

3423. $\Sigma 918$. Spec. A3. The angle has increased $6^{\circ}.3$ in 80 years at $4''.45$. $p_1 = ".022$.

3460. $\Sigma 932$. Spec. F5. The angle has decreased $17^{\circ}.6$ in 80 years at $2''.20$. $p_1 = ".021$.

3474. $O\Sigma 149$. Spec. Go. P.M. $+0^s.0003$, $-0''.081$ (Greenwich, 1910). The observations of 1843 and 1848 cannot be fitted into an ellipse with the later observations. A larger position angle for 1870 than that given below cannot be justified, and the early distances have been reduced as much as possible, but still the area described between 1843 and 1848 cannot be reduced to give a constant rate of description of area. The 1848 observation can be fitted on fairly easily. The following positions may represent the motion:—

1848.23	350.7	0.53
1870	315.7	0.65
1880	302.0	0.69
1890	289.4	0.73
1900	278.2	0.77
1910	268.5	0.82

The separation will probably continue to increase and the angular motion fall well below 1° a year. The period is probably more than 200 years.

	p_1	p_2	p_3
1870-1890	.022	.022	.022
1890-1910	.021	.018	.022

Abs. Trig. Par., $".040$ (2). Spec. Par., $".029$.

3484. $\Sigma 936$. Spec. G5. The position angle has increased $15^{\circ}.2$ in 80 years at $1''.53$. $p_1 = ".013$.

3515. $\Sigma 945$. Spec. F2. The position angle has increased $24^{\circ}.7$ in 80 years at a mean separation of $0''.91$. The measured distances seem to indicate that the separation has been decreasing, but the angular motion has been nearly constant. $p_1 = ".011$.

3542. $\Sigma 950$. 15 Monocerotis. Spec. Oe5. P.M. $+0^s.0002$, $-0''.007$ (Boss). The position angle has increased $6^{\circ}.0$ in 80 years at $2''.86$. $p_1 = ".013$. Abs. Trig. Par., $".002$ (1).

3559. $\Sigma 948$. 12 Lyncis. Spec. A2. P.M. $-0^s.0020$, $+0''.001$ (Boss). The angle has decreased at a uniform rate of $40^{\circ}.7$ in 80 years at $1''.62$. The same rate is supported by the Herschel observation of 1782 giving an arc of 68° . This indicates a period of about 700 years. $p_1 = ".027$.

3596. A. G. Clark 1. Sirius. α Canis Majoris. Spec. Ao. P.M. $-0^s.0366$, $-1''.206$ (Boss). There have been a very large number of observations in recent years, and the orbit is now very well known. Hypothetical parallax, $".446$. Abs. Trig. Par., $".376$. Spec. Par., $".376$.

3601. $O\Sigma 156$. Spec. Ao. The angular motion seems to have been nearly uniform at a rate of $49^{\circ}.2$ in 65 years. The mean separation has been $0''.62$. It is just possible that the observations cover the period of maximum separation. $p_1 = ".014$.

3615. $O\Sigma 157$. Spec. A2. The position angle has decreased uniformly $31^{\circ}.0$ in 65 years at a separation of $0''.62$. $p_1 = ".010$.

3625. $\Sigma 963$. 14 Lyncis. Spec. F5, A2. P.M. $0^s.0000$, $-0''.047$ (Boss). There is no doubt that the angular motion has considerably increased and that the separation has decreased, but recent observations are lacking and are urgently required. The following positions indicate the motion:—

1830	51.2	0.86
1860	58.4	0.76
1890	70.0	0.56
1905	80.0	0.43

For the interval 1830-1890 we find $p_1 = ".009$, $p_2 = ".017$, $p_3 = ".012$.

3692. $\Sigma 982$. 38 Geminorum. Spec. Fo. P.M. $+0^s.0050$, $-0''.085$ (Boss). The following positions indicate the motion:—

1820	176.0	5.70
1845	170.4	5.95
1870	165.4	6.20
1895	160.8	6.45
1920	156.5	6.70

These give $p_1 = ".055$, $p_3 = ".060$ for the interval 1820-1920. The period of this binary must be of the order of 2000 years. Abs. Trig. Par., $".049$ (1). Spec. Par., $".035$.

3689. $\Sigma 981$. Spec. Go. P.M. $+0^s.0194$, $-0''.245$ (Greenwich, 1910). There appears to be some motion in both position angle and distance as shown by:—

1830	149.4	3.75
1910	144.5	2.83

Whence $p_1 = .015$, $p_3 = ".031$.

3678. $O\Sigma 159$. 15 Lyncis. Spec. Go. P.M. $+0^s.0007$, $-0''.134$ (Boss). About 60° of the apparent orbit have now been observed, as is shown by:—

1843	322.7	0.418
1858	341.7	0.490
1873	355.9	0.562
1888	6.8	0.630
1903	15.8	0.686
1918	23.7	0.738

These figures give:—

	p_1	p_2	p_3
1843-1873	.014	.014	.015
1873-1903	.013	.015	.014

3710. $\Sigma 991$. Spec. Ao. P.M. $-0^s.0022$, $+0''.006$ (Greenwich, 1910). The position angle has decreased about $6^{\circ}.0$ in 85 years at $3''.84$. $p_1 = ".017$.

3728. $\Sigma 998$. Spec. A5. The position angle has increased about 6° in 80 years at $3''.10$. $p_1 = ".015$.

3755. $\beta 1022$. P.M. $+0^s.0053$, $-0''.012$ (Greenwich, 1910). Further observations are required to verify change of 38° in 28 years at $0''.39$. $p_1 = ".013$.

3793. $\Sigma 1009$. Spec. A2. In the 80 years, 1830-1910, the angle has decreased 6° and the separation has increased from $2''.95$ to $3''.65$. $p_1 = .016$, $p_3 = .027$.

3810. Ho. 29. The separation appears to have increased considerably.

3844. $O\Sigma 165$. α (45) Geminorum. Spec. Ko. P.M. $-0^s.0007$, $-0''.111$ (Boss). This is an optical pair. The following is a comparison of the observations with Hussey's ephemeris (*Publ. Lick. Obs.*, v. 82):—

	Observed.	n.	Obs.—Comp.
1897.2	43.9	3.66	3 -0.1 -".14
1905.5	37.7	4.54	3 +2.1 +.10

3876. $\Sigma 1037$. Spec. F5. P.M. $+0^s.0004$, $-0''.090$ (Greenwich, 1910). The observations indicate motion as follows:—

	1830	1845	1860	1875	1890	1900	1905	1910	1915
	332.8	326.9	321.3	315.5	308.6	302.7	298.7	293.1	281.0
	1.27	1.32	1.35	1.28	1.14	0.98	0.85	0.70	0.40

A preliminary orbit could be computed from these positions, but in the course of a few years it will be possible to get quite an accurate determination. It is quite certain that the time of maximum separation is well covered by the observations; the pair is now close. A minimum separation of about $0''.12$ should have been reached at position angle 200° about 1919.5, and the companion should pass into the first quadrant about 1925. The period will be about 200 years, the eccentricity about 0.8 and the inclination large.

	p_1	p_2	p_3
1830-1860	.018	.025	.019
1860-1890	.019	.033	.022
1890-1910	.022	.043	.034

3890. $O\Sigma 520$. Spec. A0. P.M. $-0^s.0012$, $-0''.030$ (Greenwich, 1910). The angle may be increasing, but this is not quite certain.

3905. Ho. 343. γ 2 Geminorum. Spec. Ko. P.M. $+0^s.0037$, $-0''.092$ (Boss). If the change is confirmed, this should be an optical pair. Spec. Par., ".008.

3949. $O\Sigma 170$. Spec. G0. P.M. $-0^s.0019$, $-0''.114$ (Porter). The observations of this binary are represented by:—

	1845	1860	1875	1890	1905	1915
	133.7	124.2	117.6	112.4	108.1	105.5
	0.89	1.13	1.30	1.43	1.54	1.59

The maximum separation should be about $1''.8$ and the period at least 300 years. The relative motion will be very slow for the next century.

	p_1	p_2	p_3
1845-1875	.020	.032	.027
1875-1905	.018	.025	.022

3972. $\Sigma 1068$. Spec. A2. The angle has decreased $4^\circ.6$ in 80 years at $3''.90$. $p_1 = .015$.

3970. $\Sigma 1066$. δ Geminorum. Spec. F0. P.M. $-0^s.0013$, $-0''.017$ (Boss). It is very difficult to be certain about the exact nature of the relative motion. The observations of Herschel are not sufficiently consistent to be used. A considerable increase in the angular motion is shown by the observations, but this is not sufficiently supported by the measures of distance. The following positions may be fairly correct, although considerable personal is shown in the observations:—

	1820	1850	1880	1910
	195.6	199.9	204.4	209.0
	7.20	7.26	7.17	6.83

For the whole period 1820-1910, $p_1 = .053$, $p_3 = .053$. Abs. Trig. Par., ".062 (2). Spec. Par., ".033.

3990. $\Sigma 1074$. Spec. B9. This may prove a fairly rapid binary and deserves careful attention. The separation appears to have reached a maximum of $0''.75$ or $0''.80$ about 1890. It was very small in Struve's time, and may again rapidly decrease. Early observations and recent observations are not numerous, so that it is difficult to describe the motion accurately. If Struve's angle is nearly correct the separation in 1830 could not much exceed $0''.3$. The inclination of the orbit plane to the tangent plane must be large.

4004. $\beta 1024$. P.M. $+0^s.0015$, $-0''.055$ (Greenwich, 1910). There are very few observations of this pair. They seem to indicate motion of $0''.75$ per annum at $1''.34$. $p_1 = .029$.

4016. $\Sigma 1081$. Spec. B9. Ignoring Struve's observations, we find an increase in the angle of 4° in 60 years at $1''.41$. $p_1 = .006$.

4065. $\Sigma 1093$. Spec. F5. The angle has increased uniformly $53^\circ.5$ in 80 years at a mean separation of $0''.70$. $p_1 = .014$.

4098. $\Sigma 1104$. Spec. F8. P.M. $-0^s.0129$, $-0''.263$ (Boss). There has been a nearly uniform increase in the position angle at rate of $44^\circ.2$ in 80 years at $2''.30$. $p_1 = .041$.

4122. $\Sigma 1110$. α Geminorum. Castor. Spec. A0. P.M. $-0^s.0135$, $-0''.110$ (Boss). The following

is a comparison of the Greenwich observations with Lohse's orbit I. (*Publ. Potsdam Astroph. Obs.*, xx. 91):

	Observed.	n.	Obs.—Comp.
1896.6	227.1	5.78	20 +0.5 +.08
1902.9	224.0	5.65	14 +0.2 +.02
1912.1	220.3	5.48	10 +0.8 +.13

Hypothetical parallax, ".152. Abs. Trig. Par., ".079 (5). Spec. Par., ".091.

4193. $\Sigma 1126$. Spec. Ao. P.M.—0^s.0007, —0["].029 (Boss). The observations in position angle and distance are not in good agreement. A minimum motion in angle is shown about 1870 or later, while the maximum separation does not appear to have been later than 1840. There can be no doubt but that the maximum separation is covered by the observations. The following positions cannot be considered as well established:—

	Observed.	n.	Obs.—Comp.
1788	119.7	0.7	
1830	133.0	1.4	
1872	140.0	1.35	
1914	148.0	1.0	

If we take relative motion of 10° in 80 years at 1".35 we find $p_1 = ".009$; if we assume motion of 0".6 in 125 years at 1".2, $p_3 = ".012$.

4191. $O\Sigma 177$. Spec. A3. The position angle is probably decreasing, but the early observations are hopelessly discordant.

4310. $\beta 101$. 9 Argus. Spec. Go. P.M.—0^s.0041, —0["].339 (Boss). We compare the Greenwich observations with Aitken's orbit (*Publ. Lick. Obs.*, xii. 51):—

	Observed.	n.	Obs.—Comp.
1899.04	295.9	0.32	1 +2.0 —.28
1901.32	302.7	0.48	1 +1.7 —.05
1903.17	305.5	0.44	1 —1.3 .00
1913.23	74.8	0.30	1 —7.7 —.03

Hypothetical parallax, ".067. Abs. Trig. Par., ".079 (3). Spec. Par., ".079.

4312. $O\Sigma 182$. Spec. A2. The position angle has decreased 13° 0 in 60 years at 1".08. $p_1 = ".010$.

4333. $\Sigma 1157$. Spec. Fo. There has been a uniform decrease in the position angle of 25° 5 in the 80 years 1830–1910. The separation is probably decreasing from the mean value of 1".29 for these 80 years. $p_1 = ".016$.

4355. $O\Sigma 185$. Spec. F8. P.M.—0^s.0119, —0["].003 (Porter). A new orbit has been computed and is given in later section. Hyp. Par., ".018.

4365. $\Sigma 1165$. The position angle has probably increased, but more observations are required.

4377. $\Sigma 1171$. Spec. Ko. The position angle has decreased 9° 8 in 80 years at 2".63. $p_1 = ".017$.

4402. $\Sigma 1175$. Spec. G5. P.M.+0^s.0061, —0["].088 (Bossert). The early observations are not in agreement with the later ones. The following positions may be approximately correct:—

1830	208.3	2.40
1860	214.7	2.24
1890	223.0	1.92
1911	230.8	1.66

For the whole interval, $p_1 = ".023$, $p_3 = ".028$.

4406. $O\Sigma 187$. Spec. Ao. The relative motion has recently become more rapid, and this is now a very close pair. The following positions have been obtained graphically, the distances being adjusted to give a constant rate of description of area:—

1845	305.4	0.303
1860	292.5	0.350
1875	281.7	0.368
1890	271.2	0.364
1905	259.3	0.302
1915	242.0	0.170

If the observations to 1915 are reliable the separation between 1920 and 1930 should be 0".1 or less, and by the latter date the companion should be well into the first quadrant. It should then be possible to compute an orbit. The period should not exceed 150 years.

	p_1	p_3
1845–1875	.008	.008
1875–1905	.008	.008

4414. $\beta 581$. Spec. G5. P.M.+0^s.0053, —0["].118 (Porter). The following is a comparison of the Greenwich observations of the close pair with Aitken's orbit (*Publ. Lick. Obs.*, xii. 53):—

	Observed.	n.	Obs.—Comp.
1896.59	274.4	0.48	8 — 1.9 —.07
1902.36	296.5	0.42	12 — 0.5 —.07
1910.16	70.1	0.27	2 — 1.2 +.06
1911.74	111.4	0.26	2 +14.1 —.05
1913.02	114.4	0.30	2 + 5.8 —.07
1914.22	126.2	0.27	1 + 9.7 —.14
1915.26	132.3	0.33	3 + 9.8 —.11

The star C has moved relative to AB through 10° 4 of position angle in the 25 years to 1903 at a mean separation of 4".7. This gives $p_1 = ".069$. The hypothetical parallax of the system AB is only ".033. Abs. Trig. Par., ".088 (1). Spec. Par., ".008. The last appears to be rather too small.

4418. $\Sigma 1179$. The Struve pair appears to be only optical. The separation is increasing at a rate of 3".5 per century.

4421. $\Sigma 1177$. Spec. B9. P.M.+0^s.0007, —0["].019 (Greenwich, 1910). The position angle appears to be decreasing at the rate of 4° 5 per century at a mean separation of 3".50. $p_1 = ".012$.

4452. $\Sigma 1187$. Spec. F2. The following positions show the relative motion of this pair:—

1830	72.3	1.60
1860	58.1	1.80
1905	42.8	2.23

The separation will continue to increase slowly for many years. Observations are not specially required at the present time. $p_1 = ".026$, $p_3 = ".030$.

4467. $\Sigma 1194$. Spec. A2. The position angle may be decreasing slowly, say 7° per century at $3".05$. $p_1 = ".014$.

4477. $\Sigma 1196$. ζ Cancri. Spec. Go. P.M. $+0^s.0046$, $-0".140$ for ζ^1 and $+0^s.0059$, $-0".114$ for ζ^2 (Boss). The following is a comparison of the Greenwich observations of the pair AB with Doberck's orbit (*A.N.*, 4144):—

	Observed.	n.	Obs.—Comp.
1894.22	24.2	1.14	4 -0.1 +.03
1896.42	16.2	1.09	8 -0.9 -.04
1898.62	10.1	1.06	11 0.0 -.08
1900.84	4.3	1.03	5 +1.3 -.12
1902.89	357.6	1.09	9 +1.0 -.05
1904.68	350.9	1.08	7 0.0 -.05
1906.57	344.6	1.10	8 -0.2 -.02
1908.89	334.1	1.18	8 -2.6 +.09
1910.91	325.6	0.94	6 -4.0 -.12
1912.81	316.8	0.97	5 -5.6 -.04
1914.48	310.0	0.98	7 -5.3 .00

These observations indicate that the period is rather shorter than that given by Doberck. An attempt to deduce the period from the recurrence of position angles led to the following results, obtained graphically:—

Position Angle.	Epochs.	Period.
3.5	1900.45	1781.91
20	1895.35	1834.72
15	1896.72	1836.50
10	1898.28	1838.29
5	1899.92	1840.00
0	1901.59	1841.73
355	1903.15	1843.50
350	1904.85	1845.30
345	1906.07	1846.78
340	1907.32	1848.17
335	1908.65	1849.40
330	1909.94	1850.85
325	1911.17	1852.22
320	1912.40	1853.50
315	1913.68	1854.67
310	1914.75	1855.45
305	1915.69	1856.14
300	1916.72	1856.51

The mean period from the above is 59.54 years against Doberck's period of 60.083 years. There is a marked fluctuation in the interval between the recurrence of position angles.

The hypothetical parallax from Doberck's element is $".044$. If we adopt Seeliger's result for the motion of C about AB, viz., angular motion of $0".51$ per annum at $5".44$, $p_1 = ".092$. Abs. Trig. Par., $".038$ (3). Spec. Par., $".038$ for A and $".048$ for B.

4492. $\Sigma 1202$. Spec. F8. The angle has decreased uniformly $19^\circ.0$ in 80 years at $2".41$. $p_1 = ".024$.

4502. $\beta 1244$. Spec. F8. There has been a decrease in the position angle of $12^\circ.0$ in 20 years to 1911. Separation, $0".70$. $p_1 = ".013$.

4531. $\Sigma 1211$. P.M. $-0^s.0080$, $-0".210$ (Porter). The position angle has decreased about $5^\circ.8$ in 80 years. During that interval the separation

has decreased from $1".6$ to $0".9$, with a mean value of $1".33$. $p_1 = ".006$, $p_3 = ".019$.

4526. $\Sigma 1205$. Spec. G5. The position angle has decreased $10^\circ.5$ in 80 years at $0".92$. $p_1 = ".006$.

4570. $\Sigma 1216$. Spec. Ao. P.M. $-0^s.0012$, $-0".046$ (Boss). The measures of distance are very discordant and the angles are not very accordant. The following positions depend on angles only; the distances have been adjusted to give constant rate of description of area:—

	1830	114.0	0.534
	1845	129.2	0.524
	1860	145.2	0.513
	1875	162.1	0.498
	1890	180.1	0.481
	1905	199.2	0.465
	1914	211.2	0.458

The angular motion should remain nearly steady for a considerable time at about $1\frac{1}{3}^\circ$ per annum, with very little change in distance. The period may be about 300 years, but it will not be worth while computing an orbit till after the third quadrant has been described, about 1960.

	p_1	p_2	p_3
1830-1860	.014	.014	.014
1860-1890	.015	.015	.015
1890-1914	.015	.014	.015

4602. $\Sigma 1224$. v^1 Cancri. Spec. A3, G. P.M. $-0^s.0029$, $-0".086$ (Boss). The angle has increased $7^\circ.3$ in 80 years at $5".90$. $p_1 = ".032$.

4601. $\Sigma 1223$. ϕ^2 Cancri. Spec. A2. P.M. $-0^s.0005$, $-0".008$ (Boss). The increase in position angle is very slow—only about 3° in 80 years at $4".9$. $p_1 = ".014$.

4743. $\Sigma 1263$. Spec. Ko. P.M. $-0^s.0241$, $-0".649$ (Boss). This pair is optical, with a large relative motion due to the principal star. Abs. Trig. Par., $".049$ (2). Spec. Par., $".060$.

4771. Schiaparelli. ϵ Hydræ. Spec. F8. P.M. $-0^s.0127$, $-0".054$ (Boss). The Greenwich observations of the close pair compare with Aitken's orbit (*Publ. Lick. Obs.*, xii. 59) as follows:—

	Observed.	n.	Obs.—Comp.
1896.27	211.4	0.22	1 -13.6 -.02
1899.43	264.3	0.21	5 - 3.6 +.04
1901.30	(278.4)	(0.15)	5
1902.24	(22.2)	(<.2)	4
1902.30	(280.0)	(0.10)	1
1903.14	121.5	0.16	2 -10.6 -.04
1903.28	(26.6)	(0.34)	1
1904.27	145.6	0.23	4 - 1.9 +.01
1908.27	180.8	0.25	4 -10.0 +.01
1909.93	198.4	0.23	3 - 9.4 -.01
1911.34	211.3	0.26	2 -11.3 +.02
1912.32	222.3	0.26	3 -11.2 +.03
1913.00	242.0	0.32	1 + 0.4 +.10
1914.26	250.6	0.25	3 - 8.8 +.06
1915.28	279.8	0.19	2 - 1.8 +.05

The observations which do not at all fit the orbit have been bracketed.

The following ephemeris has been constructed from Aitken's orbit. The intervals are 10° of eccentric anomaly, and the time is calculated from perihelion, 1900.97, 1916.27, etc., the period being 15.3 years:—

Time.	E.	v	θ	ρ
0.000	0	0.0	14.4	.052
.150	10	21.5	44.9	.060
.308	20	41.9	68.8	.074
.484	30	60.4	84.3	.093
.682	40	76.6	95.7	.114
.912	50	90.7	104.8	.134
1.180	60	102.8	112.7	.153
1.487	70	113.3	119.9	.171
1.841	80	122.5	126.7	.186
2.242	90	130.5	133.2	.200
2.691	100	137.7	139.7	.211
3.188	110	144.2	146.2	.220
3.730	120	150.2	152.8	.228
4.313	130	155.8	159.4	.234
4.933	140	161.0	166.2	.238
5.584	150	165.9	173.1	.241
6.259	160	170.7	180.2	.243
6.950	170	175.4	187.2	.243
7.650	180	180.0	194.4	.244
8.350	190	184.6	201.6	.243
9.041	200	189.3	208.6	.243
9.716	210	194.1	215.7	.241
10.367	220	199.0	222.6	.238
10.987	230	204.2	229.4	.234
11.570	240	209.8	236.0	.228
12.112	250	215.8	242.6	.220
12.609	260	222.3	249.1	.211
13.058	270	229.5	255.6	.200
13.459	280	237.5	262.1	.186
13.813	290	246.7	268.9	.171
14.120	300	257.2	276.1	.153
14.388	310	269.3	284.0	.134
14.618	320	283.4	293.1	.114
14.816	330	299.6	304.5	.093
14.992	340	318.1	320.0	.074
15.150	350	338.5	343.9	.060
15.300	0	0.0	14.4	.052

The star C forms with AB the system $\Sigma 1273$. The motion so far observed has been nearly uniform circular motion. It is probable, however, that the arc described covers the position of maximum separation which took place about 1890. This is indicated both by a slight variation in the angular motion and the observed distances. The following positions have been based on the observed angles only, and probably indicate a larger change in distance than has actually taken place:—

1830	195.0	3.08
1845	204.2	3.26
1860	212.6	3.42
1875	220.6	3.54
1890	228.3	3.54
1905	236.3	3.38
1915	242.0	3.19

Assuming uniform angular motion at $3''.37$, $p_1 = .060$. The hypothetical parallax from the elements of the orbit of AB is $.030$. From the fact that the close visual pair is also a spectroscopic binary the accurate parallax of $.025$ is deduced. Abs. Trig. Par., $.017$ (4). Spec. Par., $.052$ for AB and $.016$ for C.

4777. $\Sigma 1271$. Spec. F5. The position angle has increased $6^\circ.3$ in 80 years at a mean separation of $1''.33$. $p_1 = .006$.

4808. Ho. 40. The position angle may have increased 13° in 20 years to 1907 at $0''.59$. This pair should be observed again. $p_1 = .012$.

4828. $\beta 587$. 15 Hydræ. Spec. A2. P.M. $-0''.0030$, $-0''.003$ (Boss). The position angle appears to have decreased 17° in the 30 years 1878 to 1908. The mean separation has been $0''.65$, but it may be increasing. $p_1 = .012$.

4839. $\Sigma 1291$. σ^2 Cancri. Spec. Ko. P.M. $+0''.0030$, $-0''.033$ (Boss). The position angle has decreased about $10^\circ.5$ in 80 years at $1''.47$. $p_1 = .010$. Spec. Par., $.006$ for brighter and $.007$ for fainter star.

4890. $\Sigma 1300$. Spec. K5. P.M. $-0''.0067$, $-0''.313$ (Porter). There has been a decrease in the position angle of $13^\circ.9$ in 80 years at a separation of $4''.85$. $p_1 = .040$.

4901. $\beta 211$. Spec. Az. The position angle has increased $8^\circ.4$ in 35 years at $1''.04$. $p_1 = .011$.

4923. $\Sigma 1306$. σ^2 Ursæ Majoris. Spec. F8. P.M. $-0''.0009$, $-0''.070$ (Boss). This pair is now in rapid motion, and has been recently discussed by several investigators. There is an orbit with a hypothetical parallax of $.062$. Abs. Trig. Par., $.042$ (1).

4941. $\Sigma 1316$. Spec. G0. The position angle of B from A appears to be decreasing, but the rate is uncertain. C is an optical member of the system.

4972. $\Sigma 1321$. Spec. K2, K2. P.M. $-0''.1741$, $-0''.596$ for A and $-0''.1715$, $-0''.680$ for B (Boss). The relative motion is shown by the positions:—

1830	47.5	20.35
1872	57.6	19.64
1914	68.5	18.92

These give $p_1 = .206$, $p_3 = .211$. The observed parallax proves that this is a real binary. Abs. Trig. Par., $.152$ (5). Spec. Par., $.145$ for first and $.132$ for second star.

4987. $\Sigma 1327$. Spec. F8. P.M. $+0''.0053$, $-0''.022$ (Greenwich, 1910). This appears to be a purely optical system. The motion of B relative to A is $0''.068$ in $273^\circ.2$, and of C relative to A $0''.034$ in $328^\circ.0$.

5004. $\beta 588$. Spec. F5. The position angle appears to have increased $8^\circ.0$ in 35 years at $2''.42$. $p_1 = .024$.

5005. $\Sigma 1321$. Spec. Ko. P.M. $+0''.0059$, $-0''.507$ (Greenwich, 1910). The following is a comparison of the observations with See's orbit (*Evolution of Stellar Systems*, i. 94):—

	Observed.	n.	Obs.—Comp.
1893.3	4.0	0.32	3 +4.0 —.11
1895.2	9.3	0.65	4 0.0 +.08
1897.8	14.8	0.61	11 —2.6 —.10
1902.3	22.5	0.70	23 —3.7 —.09
1907.1	36.3	0.44	9 —3.6 —.05
1913.0	190.5	0.26	3 —4.7 —.10
1914.3	199.5	0.29	4 —5.7 —.19

The companion appears to be behind the predicted position.

Hypothetical parallax, $.051$. Abs. Trig. Par., $.067$ (3). Spec. Par., $.052$.

5011. $\Sigma 1333$. Spec. A5. P.M.— $0^s.0037$, $-0^m.036$ (Boss). The position angle has increased $5^\circ.3$ in 80 years at $1^m.55$. $p_1 = .007$.

5014. $\Sigma 1334$. 38 Lyncis. Spec. A2. P.M.— $0^s.0021$, $-0^m.135$ (Boss). The position angle has decreased about $6^\circ.5$ in 80 years at $2^m.85$. $p_1 = .014$.

5018. Ho. 43. Spec. F5. The position angle has decreased $31^\circ.8$ in 28 years at $0^m.46$. $p_1 = .013$. More observations are required.

5030. $\Sigma 1338$. Spec. F2. The motion is shown by the following positions:—

1830	$120^{\circ}.9$	$1^m.69$
1850	$133^{\circ}.0$	$1^m.68$
1870	$145^{\circ}.6$	$1^m.66$
1890	$158^{\circ}.8$	$1^m.62$
1910	$172^{\circ}.7$	$1^m.54$

The separation appears to be decreasing very slowly. The period should be of the order of 500 years.

	p_1	p_2	p_3
1830-1870	$.032$	$.033$	$.032$
1870-1910	$.033$	$.037$	$.033$

5056. O $\Sigma 201$. Spec. F5. P.M.— $0^s.0018$, $-0^m.046$ (Greenwich, 1910). The position angle has decreased $13^\circ.2$ in 70 years at $1^m.35$. $p_1 = .012$.

5071. $\Sigma 1348$. Spec. F5. P.M.— $0^s.0124$, $-0^m.024$ (Porter). The separation of this pair is now near maximum and the motion is very slow. The following positions represent the observations:—

1830	$334^{\circ}.5$	$1^m.11$
1872	$325^{\circ}.1$	$1^m.62$
1914	$319^{\circ}.3$	$1^m.83$

These give $p_1 = .014$, $p_2 = .031$, $p_3 = .021$.

5094. $\Sigma 1355$. Spec. F5. P.M.— $0^s.0115$, $-0^m.145$ (Porter). The observations indicate motion as follows:—

1830	$328^{\circ}.0$	$2^m.86$
1869	$330^{\circ}.9$	$2^m.62$
1908	$334^{\circ}.4$	$2^m.38$

Whence we find $p_1 = .013$, $p_3 = .020$.

5103. $\Sigma 1356$. ω Leonis. Spec. G0. P.M.— $0^s.0036$, $-0^m.013$ (Boss). The following comparison of Greenwich observations is with Dobereck's orbit (*Astr. Nach.*, 173, 251):—

	Observed.	n.	Obs.—Comp.
1897.0	$110^{\circ}.3$	$0^m.65$	13 $+1^m.2$ $-1^m.15$
1903.4	$114^{\circ}.3$	$0^m.76$	18 $-1^m.4$ $-1^m.13$
1913.1	$123^{\circ}.5$	$0^m.95$	12 $-0^m.1$ $-0^m.04$
1919.3	$127^{\circ}.4$	$1^m.07$	2 $-0^m.8$ $+0^m.5$

5171. $\Sigma 1374$. Spec. G5. P.M.— $0^s.0066$, $-0^m.147$ (Boss). The position angle has increased $13^\circ.5$ in 80 years at a mean separation of $3^m.33$. It is possible that the separation is decreasing. $p_1 = .027$.

5224. Ho. 369. Spec. F2. The position angle has increased $15^\circ.9$ in 20 years at $0^m.27$. $p_1 = .006$.

5223. O $\Sigma 208$. ϕ Ursæ Majoris. Spec. A2. P.M.— $0^s.0000$, $+0^m.009$ (Boss). A new orbit has been computed. Hyp. Par., $.011$.

5233. $\Sigma 1389$. Spec. K0. P.M.— $0^s.0096$, $-0^m.175$ (Greenwich, 1910). The motion is shown by:—

1830	$329^{\circ}.4$	$1^m.67$
1871	$316^{\circ}.8$	$1^m.97$
1912	$307^{\circ}.6$	$2^m.27$

These give $p_1 = .022$, $p_2 = .026$.

5235. A. Clark 5. 8 Sextantis. Spec. A2. P.M.— $0^s.0043$, $-0^m.041$ (Boss). The following comparison is with Schoenberg's orbit (*Astr. Nach.*, 178, 189):—

	Observed.	n.	Obs.—Comp.
1901.0	$84^{\circ}.5$	$0^m.33$	7 $-1^m.1$ $-1^m.16$
1912.5	$69^{\circ}.5$	$0^m.47$	8 $+2^m.3$ $-1^m.12$

5281. O $\Sigma 210$. Spec. G5. The position angle seems to be decreasing slowly— $8^\circ.6$ in 70 years at $0^m.89$. $p_1 = .006$.

5349. O $\Sigma 213$. Spec. G5. P.M.— $0^s.0010$, $-0^m.126$ (Greenwich, 1910). The position angle has decreased uniformly $21^\circ.3$ in 70 years at $1^m.00$. $p_1 = .012$.

5365. O $\Sigma 215$. Spec. F0. The motion of this binary is very slow at present—only about half a degree a year in position angle. The separation is increasing, and will not reach a maximum for many years. The period should be of the order of 400 years at least. The following positions represent the observations very well in both angle and distance. The distances are given as determined by the law of areas:—

1843	$270^{\circ}.1$	$0^m.468$
1861	$241^{\circ}.3$	$0^m.570$
1879	$222^{\circ}.7$	$0^m.714$
1897	$210^{\circ}.3$	$0^m.849$
1915	$201^{\circ}.1$	$0^m.952$

These figures give the hypothetical parallax as follows:—

	p_1	p_2	p_3
1843-1879	$.018$	$.015$	$.020$
1879-1915	$.016$	$.020$	$.018$

5385. $\Sigma 1423$. Spec. K0. P.M.— $0^s.012$, $-0^m.02$ (Porter). The following positions represent the observations:—

1830	$100^{\circ}.8$	$1^m.09$
1851	$85^{\circ}.2$	$1^m.23$
1872	$72^{\circ}.7$	$1^m.38$
1893	$62^{\circ}.7$	$1^m.48$
1914	$53^{\circ}.6$	$1^m.52$

The relative motion is now very slow. We find the hypothetical parallax as follows :—

	p_1	p_2	p_3
1830-1872	·024	·024	·027
1872-1914	·023	·031	·023

5388. $\Sigma 1424$. γ Leonis. Spec. Ko. P.M. $+0^s.0215$, $-0^s.153$ for A, $+0^s.0215$, $-0^s.182$ for B (Boss). There is still very little departure from rectilinear motion, although there is no doubt that this is a real binary. The following positions represent the observations since Herschel :—

	α	δ
1785	85°2	1°73
1800	92°5	1°99
1830	102°8	2°48
1860	109°6	3°00
1890	114°4	3°52
1920	118°0	4°00

The motion in angle is now extremely slow. Accurate observations in distance will probably first show departure from rectilinear motion.

	p_1	p_2
1800-1860	·028	·041
1860-1920	·025	·044

Abs. Trig. Par., $^s.000$ (3). Spec. Par., $^s.044$ for brighter and $^s.016$ for fainter star.

5397. $\Sigma 1426$. Spec. F5. The position angle has increased uniformly $29^{\circ}.6$ in 85 years. The mean separation has been $0^s.74$. $p_1 = ^s.010$.

5409. O $\Sigma 216$. Spec. G5. P.M. $-0^s.0183$, $-0^s.124$ (Porter). The angular motion of this pair has increased rapidly and further observations are required. The following positions show the motion observed :—

	α	δ
1843	168°0	1°88
1861	155°5	1°89
1879	142°2	1°72
1897	122°9	1°33
1915	86°0	0°94

These places give :—

	p_1	p_2	p_3
1843-1879	·040	·057	·039
1879-1915	·047	·047	·051

5421. $\Sigma 1429$. Spec. G5. P.M. $+0^s.0018$, $-0^s.203$ (Greenwich, 1910). The arc described indicates that the orbit plane passes near the line of sight. The separation is steadily decreasing and the motion is becoming rapid.

	α	δ
1830	270°5	1°51
1851	266°8	1°37
1872	262°2	1°20
1893	255°4	0°96
1914	243°0	0°65

Whence we find :—

	p_1	p_2	p_3
1830-1872	·012	·021	·018
1872-1914	·015	·023	·024

5426. $\Sigma 1431$. Spec. Fo. P.M. $-0^s.0015$, $-0^s.013$ (Boss). The position angle has increased only $3^{\circ}.6$ in a century. The separation is $3^s.3$, giving $p_1 = ^s.010$. No observations are required at present.

5433. $\Sigma 1434$. Spec. G5. P.M. $-0^s.006$, $-0^s.12$ (Porter). The position angle has increased $5^{\circ}.5$ in 80 years at a mean separation of $6^s.23$. $p_1 = ^s.028$.

5437. O $\Sigma 218$. Spec. Ko. P.M. $-0^s.0095$, $-0^s.020$ (Bossert). There has been an increase in the position angle of $19^{\circ}.8$ in 70 years. The mean separation has been $1^s.01$, giving $p_1 = ^s.012$.

5445. O $\Sigma 220$. Spec. F8. The position angle has increased $10^{\circ}.5$ in 70 years at $1^s.29$. $p_1 = ^s.010$.

5448. $\Sigma 1439$. Spec. G5. P.M. $+0^s.007$, $-0^s.07$ (Porter). The motion is indicated by :—

	α	δ
1830	131°3	2°06
1871	121°7	1°89
1912	110°5	1°72

These give $p_1 = ^s.020$, $p_3 = ^s.022$.

5508. $\Sigma 1457$. Spec. F2. The early observations are rather discordant and the relative motion in angle is now very slow. The following positions may approximate to the truth :—

	α	δ
1830	290°0	0°54
1860	308°8	0°98
1890	316°7	1°25
1920	322°0	1°45

From these we find :—

	p_1	p_2
1830-1890	·015	·022
1890-1920	·012	·019

5515. O $\Sigma 224$. Spec. F5. P.M. $-0^s.0064$, $+0^s.008$ (Bossert). The maximum separation was probably reached about 1890, but the variation in the separation is not large. It is not possible at present to determine an orbit with any certainty, but it may be said that the period will not greatly exceed 200 years. Neither the eccentricity nor the inclination should be very large. The motion at present is about 1 degree per annum. The following positions give constant rate of description of area :—

	α	δ
1843	18°5	0°417
1861	349°0	0°502
1879	326°8	0°545
1897	305°9	0°545
1915	284°0	0°519

The hypothetical parallax is then found as follows :—

	p_1	p_2	p_3
1843-1879	·017	·019	·017
1879-1915	·016	·018	·016

5527. OΣ227. Spec. A2. The observations are represented by:—

1845	328.2	0.50
1878	339.2	0.54
1911	348.7	0.59

These give $p_1 = ".007$.

5533. Σ1465. The position angle may be decreasing—say, $5^{\circ}.3$ in 80 years at $2".20$. $p_1 = ".010$.

5558. OΣ228. Spec. Fo. P.M. $-0^s.0085$, $-0".005$ (Bossert). The observations are not very accordant, but may be considered as indicating a motion of 13° in 60 years at $0".45$. $p_1 = ".004$.

5560. OΣ229. Spec. A3. The position angle has decreased from $349^{\circ}.2$ in 1845 to $312^{\circ}.8$ in 1915 at a nearly uniform rate. The mean separation has been $0".80$. $p_1 = ".014$.

5572. Σ1476. 40 Sextantis. Spec. A2. P.M. $-0^s.0035$, $-0".013$ (Boss). The position angle has increased $10^{\circ}.7$ in 80 years at a mean separation of $2".13$. The measured distances show an increase from $2".0$ to $2".4$, not supported by the change in angle. $p_1 = ".015$.

5599. OΣ230. Spec. F5. The position angle has increased $14^{\circ}.8$ in 60 years at $8".44$. If this were a physical system, we would deduce $p_1 = ".088$, but it is quite probable that this is only an optical pair. A parallax determination, or a determination of the proper motion of the brighter component, is desirable.

5603. Σ1487. 54 Leonis. Spec. A0. P.M. $-0^s.0055$, $-".017$ (Boss). The position angle has increased $5^{\circ}.7$ in 100 years at $6".33$. $p_1 = ".025$.

5633. Σ1500. Spec. F8. The relative motion is shown by:—

1830	325.0	1.00
1872	315.0	1.36
1914	308.3	1.50

Whence we derive $p_1 = ".012$, $p_2 = ".025$, $p_3 = ".018$. It is possible that maximum separation has nearly been reached.

5659. Σ1504. Spec. Fo. The observed motion is as follows:—

1830	275.8	1.07
1872	284.0	1.15
1914	291.2	1.22

The period will be thousands of years. $p_1 = ".010$, $p_3 = ".011$.

5676. β599. 65 Leonis. Spec. G5. P.M. $-0^s.0251$, $-0".087$ (Boss). The position angle is probably increasing. Spec. Par., $".024$.

5679. Σ1510. Spec. F5. The position angle has decreased $7^{\circ}.2$ in 80 years at $4".1$. $p_1 = ".022$.

5694. H. 2562. P.M. $-0^s.0084$, $+0".022$ (Greenwich, 1910). This pair requires observation. The position angle appears to have decreased $34^{\circ}.9$ in 80 years. Mean separation, $1".24$. The Greenwich measure of distance appears to be much too large. $p_1 = ".019$.

5707. Σ1517. Spec. Go. P.M. $-0^s.0272$, $-0".147$ (Boss). It is still very difficult to form any definite conclusions as to the apparent orbit of this binary. The early observations given by Burnham in his general catalogue do not appear to be representative. When the observed angles and distances are plotted against the time and the smooth curves adjusted so as to give constant rate of description of area, the following positions are obtained:—

1830	289.4	1.11
1845	288.1	0.98
1860	286.3	0.82
1875	283.2	0.57
1890	277.3	0.43
1905	267.5	0.34
1914	260.8	0.36

But these points do not lie on an elliptic arc, and, in fact, the curve through them appears to be convex to the principal star. It does not appear to be possible at the present time to adjust the observations in a way which is convincing. Lewis's suggestion that the position angles after 1896 should be reversed does not appear to be tenable. It is probable that the position angles and distances given above for 1905 and 1914 must be considerably reduced. The pair should be carefully observed with large refractors. $p_3 = ".019$.

5734. Σ1523. ξ Ursæ Majoris. Spec. Go. P.M. $-0^s.0333$, $-0".598$ (Boss). Comparison with Nörlund's orbit (*Astr. Nach.*, 170, 121):—

Observed.		n.	Obs.—Comp.	
1893.74	185.4	1.79	5	+0.9 +.05
1898.29	158.1	2.09	7	-1.9 +.02
1901.32	148.4	2.30	9	+0.4 -.04
1903.96	140.4	2.50	7	+0.9 -.07
1908.49	127.7	2.75	8	-0.3 -.15
1911.33	122.1	2.85	8	+0.3 -.18
1914.20	116.7	2.94	11	+0.7 -.16
1919.42	105.9	2.99	2	+0.5 +.02

Hypothetical parallax, $".130$. Abs. Trig. Par., $".158$ (3). Spec. Par., $".126$ for brighter and $".120$ for fainter star.

5739. Σ1527. Spec. Go. P.M. $+0^s.0036$, $-0".157$ (Porter). The position angle has increased $7^{\circ}.8$ in 80 years at $3".58$. $p_1 = ".020$.

5757. Σ1534. Spec. G5. P.M. $-0^s.0108$, $-0".098$ (Porter). The position angle has decreased 15° in 80 years at a mean separation of $5".06$. The separation is increasing and the angular motion decreasing. If this is a binary, $p_1 = ".044$.

5765. Σ1536. ι Leonis. Spec. F5. P.M. $+0^s.0105$, $-0".085$ (Boss). The angular motion of this binary has increased rapidly in recent years,

and careful measures ought to be made at regular intervals. The observations are represented by:—

1830	94.1	2.16
1860	76.7	2.68
1890	60.7	2.53
1905	50.8	2.17
1920	36.4	1.74

Two orbits have previously been computed from insufficient data, but it is quite probable that the period is relatively short and of the order of 200 years.

	p_1	p_2	p_3
1830-1890	.048	.076	.046
1890-1920	.050	.060	.061

Spec. Par., ".058 for brighter star.

5793. $\Sigma 1543$. 57 Ursæ Majoris. Spec. A2. P.M. $-0^s.0044$, $+0^m.009$ (Boss). The position angle has decreased $8^{\circ}.9$ in 80 years at $5^m.48$. $p_1 = ".033$.

5805. $O\Sigma 234$. Spec. F5. P.M. $+0^s.0081$, $-0^m.093$ (Greenwich, 1890). The observations are compared with See's orbit (*Evolution of Stellar Systems*, vol. i. 112):—

	Observed.	n.	Obs.—Comp.
1899.36	131.7	0.33	4 — 5.0 — .03
1902.49	142.8	0.29	10 — 1.8 — .10
1912.12	158.9	0.37	7 — 4.5 — .07
1919.46	162.3	0.37	2 — 14.3 — .05

The hypothetical parallax is ".015. Abs. Trig. Par., ".044 (1). Spec. Par., ".012.

5811. $O\Sigma 235$. Spec. F5. P.M. $-0^s.0005$, $-0^m.079$ (Boss). We compare the Greenwich observations with Aitken's orbit (*Publ. Lick. Obs.*, xii. 72):—

	Observed.	n.	Obs.—Comp.
1900.35	118.4	0.53	5 + 1.1 — .02
1905.28	180.5	0.35	2 + 11.6 — .02
1912.75	255.4	0.40	5 — 3.0 — .10
1919.45	284.7	0.41	1 — 18.0 — .17

The hypothetical parallax is ".036. Abs. Trig. Par., ".057 (1). Spec. Par., ".044.

5841. $\Sigma 1555$. Spec. A3. P.M. $+0^s.0022$, $-0^m.020$ (Boss). This is now a very difficult pair. It is only recently that the observations have shown a departure from rectilinear motion. The observations may be represented by:—

1830	338.2	1.22
1860	340.9	0.94
1890	346.5	0.58
1905	353.4	0.38
1917	13.4	0.16

This binary should be very carefully observed at the present time with the largest refractors, so that reliable observations may be secured before the companion moves again into the fourth quadrant.

	p_1	p_2	p_3
1830-1890	.007	.017	.019
1890-1917	.010	.013	.019

5858. $\Sigma 1561$. Spec. Go. P.M. $-0^s.0555$, $+0^m.019$ (Boss). The position angle has decreased $8^{\circ}.3$ in 80 years at $10^m.2$. If this is a physical pair, $p_1 = ".060$. Abs. Trig. Par., ".038 (1). Spec. Par., ".036 for brighter and ".042 for fainter star.

5859. $O\Sigma 237$. Spec. F8. The observations of this pair are represented by:—

1845	291.1	0.67
1869	275.5	0.98
1893	266.8	1.20
1917	260.2	1.30

The separation should slowly increase till 1950.

	p_1	p_2	p_3
1845-1893	.016	.024	.022
1869-1917	.015	.028	.018

5926. $\beta 603$. Spec. A5. P.M. $-0^s.0079$, $+0^m.014$ (Porter). The observations indicate motion as follows:—

1878	337.4	1.30
1896	323.2	1.12
1914	299.0	0.76

These positions give $p_1 = ".031$.

5970. $O\Sigma 241$. Spec. F2. The position angle has increased $12^{\circ}.3$ in 70 years at a mean separation of $1^m.45$. $p_1 = ".012$.

6030. $\Sigma 1601$. The position angle has decreased $7^{\circ}.8$ in 80 years at $2^m.29$. $p_1 = ".013$.

6053. $\Sigma 1606$. Spec. A3. The motion is represented by:—

1830	352.2	1.38
1860	344.8	1.28
1890	335.9	1.13
1914	326.4	0.96

From these figures we find the hypothetical parallax as follows:—

	p_1	p_2	p_3
1830-1890	.014	.020	.016
1860-1914	.015	.021	.017

6076. $\Sigma 1613$. Spec. F5. The position angle has decreased $6^{\circ}.2$ in 80 years at $1^m.45$. $p_1 = ".007$.

6090. $\Sigma 1619$. Spec. G5. P.M. $-0^s.0177$, $-0^m.055$ (Porter). The position angle has decreased $9^{\circ}.5$ in 80 years at $7^m.45$. $p_1 = ".048$.

6097. $\Sigma 1621$. There has been considerable motion for this pair in both angle and distance. The observations are represented by:—

1830	124.0	3.44
1872	130.5	3.00
1914	141.0	2.13

From which we find $p_1 = ".027$, $p_3 = ".040$.

6158. $\Sigma 1639$. Spec. A5. P.M. +0^s.0014, -0^s.011 (Greenwich 1910). A new orbit has been computed and is given later. Hyp. Par., ".016. Abs. Trig. Par., -.022 (r). Spec. Par., ".013.

6174. $\Sigma 1643$. Spec. K2. P.M. +0^s.0030, -0^s.242 (Greenwich, 1910). The position angle has decreased uniformly 37^o.2 in 80 years at 1^s.95. $p_1 = ".030$.

6187. $\Sigma 1647$. Spec. F2. P.M. +0^s.0034, -0^s.056 (Boss). The extreme observations are represented by :—

1830	202 ^o .0	1 ^s .20
1920	226 ^o .3	1 ^s .56

but it is difficult to fit the intermediate observations into this scheme, the observed position angle between 1850 and 1860 being too large. It is probable that Struve's angle is several degrees too small. Using a mean separation of 1^s.28, $p_1 = ".014$.

6211. $\Sigma 1658$. Spec. F8. The position angle has increased 18^o.9 in 80 years, uniformly, at 2^s.30. $p_1 = ".023$.

6216. $\Sigma 1661$. Spec. G5. P.M. -0^s.0198, -0^s.078 (Porter). The position angle has shown a uniform increase of 13^o.0 in 80 years at 2^s.46. $p_1 = ".019$.

6222. $\Sigma 1663$. Spec. F2. The position angle has decreased 18^o.4 in 80 years at 0^s.70. $p_1 = ".007$.

6243. $\Sigma 1670$. γ Virginis. Spec. Fo. P.M. -0^s.0376, +0^s.004 (Boss). The following is a comparison of Greenwich observations with Doberck's orbit (*Astr. Nach.*, 177, 161) :—

	Observed.		n.	Obs.—Comp.	
1898.7	329 ^o .7	5 ^s .84	15	-0 ^s .5	+ ^s .04
1914.3	325 ^o .2	5 ^s .83	7	-0 ^s .2	- ^s .26
1917.4	323 ^o .9	6 ^s .22	4	-0 ^s .6	+ ^s .11
1919.4	322 ^o .1	6 ^s .19	3	-1 ^s .8	+0 ^s .6

Hyp. Par., ".092. Abs. Trig. Par., ".068 (3). Spec. Par., ".050 for S. star and ".055 for N. star.

6296. $\Sigma 1687$. $\zeta 35$ Comæ. Spec. Ko. P.M. -0^s.0036, -0^s.031 (Boss). A considerable arc of the apparent orbit has now been described and is shown by the positions given below :—

1830	26 ^o .6	1 ^s .37
1850	40 ^o .7	1 ^s .35
1870	55 ^o .5	1 ^s .30
1880	63 ^o .4	1 ^s .27
1890	71 ^o .7	1 ^s .24
1900	80 ^o .4	1 ^s .21
1910	89 ^o .6	1 ^s .17
1920	99 ^o .6	1 ^s .12

The period may be of the order of 400 years. These positions give :—

	p_1	p_2	p_3
1830-1890	.029	.028	.028
1880-1920	.030	.032	.030

6312. $O\Sigma 256$. Spec. F5. P.M. +0^s.0001, -0^s.097 (Porter). The observed motion is shown by the following positions :—

1845	50 ^o .7	0 ^s .58
1881	67 ^o .3	0 ^s .64
1917	81 ^o .1	0 ^s .76

These positions give $p_1 = ".010$, $p_3 = ".010$.

6329. $\Sigma 1699$. Spec. G5. P.M. -0^s.0117, -0^s.092 (Greenwich, 1910). The position angle appears to have increased 3^o.7 in 80 years at 1^s.46. $p_1 = ".005$.

6348. $\beta 1082$. 78 Ursæ Majoris. Spec. Fo. P.M. +0^s.0120, -0^s.023 (Boss). The position angle increased at a rate of 18^o.2 in the 13 years to 1902. Further observations are required. With a mean separation of 1^s.42, $p_1 = ".047$.

6358. $\Sigma 1711$. Spec. F5. The position angle has decreased 10^o.2 in 80 years at a mean separation of 1^s.12. The observations in angle are discordant, and possibly the true angular motion less than that given. The separation has decreased from 1^s.4 to 0^s.9. $p_1 = ".008$.

6369. $\Sigma 1714$. P.M. +0^s.0034, -0^s.007 (Greenwich, 1910). The position angle has decreased 4^o.2 in 80 years at 3^s.15. $p_1 = ".012$.

6367. $\beta 929$. 48 Virginis. Spec. Fo. P.M. -0^s.0030, -0^s.040 (Boss). The position angle has decreased 10^o in 30 years at 0^s.56. $p_1 = ".007$.

6373. $\Sigma 1716$. Spec. Fo. There is a rather uncertain decrease of 7^o.6 in 80 years at 2^s.54. $p_1 = ".014$.

6386. $\beta 930$. Spec. Ko. P.M. +0^s.0004, +0^s.029 (Boss). The position angle may be increasing, but the rate is rather doubtful.

6395. $O\Sigma 260$. Spec. F8. P.M. +0^s.0008, +0^s.046 (Greenwich, 1910). The position angle has increased 18^o.4 in 70 years at 0^s.70. $p_1 = ".008$.

6406. $\Sigma 1728$. $\zeta 42$ Comæ. Spec. F5. P.M. -0^s.0303, +0^s.122 (Boss). The following is a comparison of the observations with Doberck's orbit (*Astr. Nach.*, 179, 55). The computed angles are all either 11^o.2 or 191^o.2 :—

	Observed.		n.	Obs.—Comp.	
1893.40	199 ^o .5	0 ^s .47	2	+ 8 ^o .3	+ ^s .17
1896.33	201 ^o .1	0 ^s .15	1	+ 9 ^o .9	+ ^s .12
1897.34	350 ^o .1	0 ^s .07	1	-21 ^o .1	.00
1898.39	23 ^o .7	0 ^s .17	2	+12 ^o .5	- ^s .01
1899.31	6 ^o .3	0 ^s .23	5	- 4 ^o .9	- ^s .02
1900.42	22 ^o .3	0 ^s .27	5	+11 ^o .1	- ^s .08
1901.37	16 ^o .4	0 ^s .27	5	+ 5 ^o .2	- ^s .16
1902.30	13 ^o .5	0 ^s .40	5	+ 2 ^o .3	- ^s .10
1903.29	14 ^o .1	0 ^s .39	4	+ 2 ^o .9	- ^s .17
1904.42	17 ^o .4	0 ^s .36	3	+ 6 ^o .2	- ^s .25
1905.36	13 ^o .5	0 ^s .54	2	+ 2 ^o .3	- ^s .09

	Observed.	n.	Obs.—Comp.
1908.35	11.4	0.46	4 +0.2 -0.04
1909.36	12.4	0.42	3 +1.2 +0.09
1910.40	7.3	0.33	1 -3.9 +2.25
1912.38	192.4	0.25	4 +1.2 -1.15
1913.34	191.1	0.26	3 -0.1 -2.24
1914.36	192.1	0.38	5 +0.9 -1.16
1915.37	195.2	0.48	2 +4.0 -0.04
1916.37	193.2	0.60	1 +2.0 +1.12
1917.38	192.4	0.42	3 +1.2 +0.01
1919.36	192.1	0.33	1 +0.9 +1.18

The differences between the observed and computed distances indicate that the actual motion has fallen behind the predicted motion to the extent of about 1 year. This shows that the adopted period of 25.335 years is too small. The same result is indicated by Aitken's observations made in the critical year 1910. The pair should be carefully observed with large refractors in 1921 and 1922.

The hypothetical parallax is $''062$. Abs. Trig. Par., $''070$ (3). Spec. Par., $''055$.

6415. OΣ261. Spec. F8. The motion which is mostly in distance is represented by:—

	p_1	p_2
1845	1.3	0.55
1860	353.2	0.92
1880	348.6	1.28
1900	345.9	1.57
1920	344.0	1.80

From which we deduce:—

	p_1	p_2
1845-1880	$''013$	$''031$
1880-1920	$''010$	$''026$

6442. β800. Spec. Ko. P.M. +0^s.0445, -0^s.269 (Porter). This is a remarkable pair. The separation has increased at a nearly constant rate from $1''27$ in 1881.4 to $3''93$ in 1919.4, while the position angle has decreased from $121^\circ5$ to $109^\circ3$. This corresponds to a proper motion of the faint star relative to the bright one of $''073$ in 104° . Now the bright star has the large proper motion of $0''691$ in $112^\circ9$. The large relative motion and the large difference in magnitude indicate that the pair is optical, but the large absolute motions and the late spectral type indicate that it is orbital with a large parallax. If this is a real binary, the maximum separation may be of the order of $10''$ or more $p_1 = ''032$, $p_2 = ''095$. Abs. Trig. Par., $''076$ (1). Spec. Par., $''091$.

6455. Σ1734. Spec. A0. The position angle has decreased $10^\circ5$ in 80 years at a mean separation of $1''07$. The distance is probably increasing. $p_1 = ''007$.

6476. Ho. 260. Spec. K5. P.M. -0^s.0343, +0^s.239 (Greenwich, 1910). The position angle has increased 40° in 30 years. The mean separation has been $0''72$, but may be increasing. $p_1 = ''023$.

6494. OΣ266. Spec. F5. The position angle has increased from $328^\circ5$ in 1845 to $344^\circ2$ in 1915, and the separation has increased from $1''18$ to $1''80$ in the same interval. The mean separation has been $1''52$. $p_1 = ''015$, $p_2 = ''022$.

6500. β113. The position angle has increased $26^\circ4$ in 40 years at a mean separation of $1''47$. $p_1 = ''029$.

6510. Σ1752. Spec. F8. The position angle has apparently decreased $9^\circ2$ in 70 years at $1''55$. $p_1 = ''011$.

6524. OΣ269. Spec. A5. The motion of this pair is still quite uncertain. Orbits have been computed giving a hypothetical parallax of $''019$, but these are uncertain. Abs. Trig. Par., $''073$ (1). From consideration of magnitude and spectral type, this appears to be too large.

6527. Σ1758. Spec. G0. The position angle has decreased $6^\circ6$ in 70 years at $4''15$. $p_1 = ''023$.

6530. Σ1757. Spec. Ko. P.M. -0^s.0154, +0^s.037 (Porter). The observed angles and distances require some alteration to give constant rates of description of area. After reasonable adjustment the following positions were obtained:—

	p_1	p_2	p_3
1833	24.6	1.48	
1846	41.3	1.78	
1859	53.5	2.03	
1872	63.1	2.25	
1885	71.1	2.45	
1898	77.9	2.63	
1911	84.0	2.73	

The separation will probably increase to about $2''8$ in 1940, when the position angle will be about 95° . These positions give the following values of the hypothetical parallax:—

	p_1	p_2	p_3
1833-1859	$''051$	$''057$	$''056$
1859-1885	$''046$	$''051$	$''051$
1885-1911	$''044$	$''066$	$''047$

6566. Σ1768. 25 Canum Venaticorum. Spec. Fo. P.M. -0^s.0086, +0^s.014 (Boss). A new orbit has been computed with hypothetical parallax $''026$.

6571. Σ1769. Spec. G5. P.M. -0^s.0192, -0^s.163 (Boss). The separation may be decreasing.

6578. β612. Spec. F2. P.M. -0^s.0076, -0^s.011 (Boss). The following is a comparison of the observations with Aitken's orbit (*Publ. Lick. Obs.*, xii. 85):—

	Observed.	n.	Obs.—Comp.
1893.47	193.1	0.39	1 -10.8 +0.06
1895.35	210.6	0.52	2 -0.5 +1.18
1896.41	212.1	0.34	2 -3.1 -0.00
1897.37	223.9	0.32	2 +5.1 -0.01
1898.38	217.6	0.42	3 -5.3 +1.10
1899.39	221.8	0.36	2 -5.5 +0.06
1900.43	227.3	0.31	1 -5.3 +0.03
1901.44	229.3	0.27	3 -9.5 +0.02
1902.34	246.5	0.27	2 +0.4 +0.05
1903.40	246.4	0.23	5 -11.8 +0.06
1912.38	181.2	0.19	4 +0.8 -0.03
1913.36	194.5	0.21	6 +6.5 -0.04
1914.42	194.9	0.23	6 +0.7 -0.05
1915.36	210.4	0.30	2 +11.7 -0.00
1917.07	214.3	0.29	3 +8.2 -0.04
1919.40	214.9	0.25	1 -0.1 -0.09

These observations indicate that the adopted period is too long. The repetition of position angles indicate periods as follows :—

			Period.
238 ^o .6	1878.69	1901.65	22.96
52.4	1884.02	1907.72	23.70
170.0	1889.68	1911.05	21.37
180.0	1890.38	1911.88	21.50
190.0	1891.36	1913.08	21.72
200.0	1892.90	1914.54	21.64
210.0	1895.28	1916.75	21.47

These periods do not agree very well, but the actual period is probably under 22 years. The hypothetical parallax from the orbit elements is ".022. Abs. Trig. Par., ".015 (5). Spec. Par., ".011.

6586. $\Sigma 1772$. ι Boötis. Spec. A2. P.M. $-0^s.0033$, $+0^s.009$ (Boss). The position angle has decreased $8^{\circ}.4$ in 80 years at $4^{\prime}.82$. $p_1 = ".028$.

6599. $\Sigma 1777$. 84 Virginis. Spec. K0. P.M. $-0^s.0195$, $-0^s.078$ (Boss). The position angle has decreased $6^{\circ}.9$ in 90 years at $3^{\prime}.40$. $p_1 = ".016$. Spec. Par., ".009.

6619. $\Sigma 1781$. Spec. G0. The following positions give the motion to 1914 :—

1830	236 ^o .6	1.37
1845	242.9	1.30
1860	250.0	1.21
1875	258.2	1.12
1890	267.7	1.04
1905	278.7	0.97
1914	286.1	0.93

From these positions we deduce :—

	p_1	p_2	p_3
1830-1860	.020	.026	.021
1860-1890	.021	.018	.022
1890-1914	.022	.018	.023

6641. $\Sigma 1785$. Spec. K2. P.M. $-0^s.0364$, $-0^s.078$ (Greenwich, 1910). A new orbit has been computed with a hypothetical parallax of ".060. Spec. Par., ".069, for both components.

6668. $\Sigma 1788$. Spec. F8. P.M. $-0^s.0110$, $-0^s.030$ (Boss). The separation appears to be increasing fairly rapidly, although the measures are not very good.

1831	53 ^o .9	2.30
1858	64.1	2.42
1885	73.0	2.64
1912	80.5	2.89

These give $p_1 = ".032$, $p_3 = ".035$. Spec. Par., ".033.

6671. $\Sigma 272$. Spec. F2. P.M. $-0^s.0039$, $-0^s.004$ (Greenwich, 1910). The position angle has probably decreased about 11° in 70 years at $1^{\prime}.80$. $p_1 = ".014$.

6711. $\beta 1270$. Spec. F5. Comparison of observations with Aitken's orbit (*Publ. Lick. Obs.*, xii. 88) :—

	Observed.	n.	Obs.—Comp.
1896.40	356 ^o .2	0.43	1 + 8.3 + ".12
1897.41	346.0	0.27	1 - 6.0 - .03
1898.44	342.8	0.44	3 - 13.7 + .14
1901.51	15.1	0.31	1 + 3.9 + .05
1903.40	23.1	0.17	2 - 0.3 - .06
1913.38	131.0	0.11	1

For 1902.7, when no elongation was observed, the computed separation was $0^{\prime}.24$. Hyp. Par., ".017.

6725. $\Sigma 1802$. Spec. G0. P.M. $+0^s.0061$, $-0^s.109$ (Porter). The position angle may have decreased slightly, but the principal change has been an increase in the separation of about $0^{\prime}.011$ annually for the 80 years to 1910. Using a mean separation of $4^{\prime}.7$, $p_3 = ".033$.

6746. $\Sigma 1808$. Spec. G5. P.M. $-0^s.0119$, $-0^s.047$ (Greenwich, 1910). The position angle has increased $6^{\circ}.3$ in 80 years at a mean separation of $2^{\prime}.78$. $p_1 = ".014$.

6758. $\Sigma 277$. Spec. F2. P.M. $-0^s.0032$, $-0^s.012$ (Greenwich, 1910). The position angle has increased $23^{\circ}.5$ in 70 years at $0^{\prime}.48$. $p_1 = ".006$.

6764. $\Sigma 278$. Spec. F2. The separation is now decreasing fairly rapidly, as is shown by the following positions :—

1840	148 ^o .7	0.40
1855	136.6	0.385
1870	123.5	0.37
1885	109.1	0.35
1900	92.2	0.315
1915	68.6	0.25

The period will probably exceed 300 years.

	p_1	p_2	p_3
1840-1870	.009	.009	.009
1870-1900	.010	.011	.010

6766. $\beta 224$. Spec. G0. The position angle has decreased 12° in 36 years at $0^{\prime}.76$. $p_1 = ".010$.

6776. $\Sigma 1820$. Spec. K2. P.M. $-0^s.0403$, $-0^s.021$ (Porter). The separation is steadily decreasing and the angular motion increasing :—

1830	45 ^o .8	2.44
1845	51.8	2.42
1860	58.0	2.38
1875	64.4	2.32
1890	71.2	2.24
1905	78.6	2.14
1914	83.4	2.06

The period will probably be at least 500 years.

	p_1	p_2	p_3
1830-1890	.036	.042	.039
1860-1914	.036	.040	.037

6773. $\Sigma 1817$. Spec. F8. P.M. $-0^s.0016$, $-0''.013$ (Greenwich, 1910). The position angle has decreased 6° in 80 years at a separation of $1''.50$. $p_1 = ''007$.

6780. $\Sigma 1819$. Spec. F8. P.M. $-0^s.0127$, $+0''.038$ (Porter). Nearly 110° of position angle have been described since the first observations of Struve. The maximum separation appears to have been reached about 1890. The period will probably be of the order of 250 or 300 years. It should soon be possible to compute a preliminary orbit. The following positions show the observed motion:—

1830	85.9	0.91
1840	67.5	0.95
1850	51.3	1.03
1860	37.9	1.16
1870	27.0	1.27
1880	17.6	1.33
1890	8.7	1.35
1900	359.8	1.33
1910	350.4	1.27
1920	339.7	1.18

These positions determine the hypothetical parallax as follows:—

	p_1	p_2	p_3
1830-1870	''035	''029	''037
1880-1920	''034	''043	''033

6832. $\Sigma 1834$. Spec. F8. The motion of this pair can only be described more or less qualitatively. In 1830 the separation was $1''.36$ and the position angle $113^\circ.7$, according to Struve. The separation steadily decreased and the position angle slowly increased. In 1892-17 Burnham gave the position angle as $125^\circ.1$ and the separation as $0''.26$. This is probably nearly correct. About 1898 the companion would pass through position angle 180° at a distance considerably less than $0''.1$. The separation would then increase and reach a maximum represented by Aitken's observation of 1903.60, $276^\circ.3$, $0''.12$. The separation would again be very small, as the companion passed from the fourth to the first quadrant about 1906. In 1920 the separation should be again gradually increasing from about 110° towards the position at the time of Struve's observations.

It will be impossible to determine an orbit till the original position is approached, and even then there will be difficulties because of the scarcity and uncertainty of many of the observations at the epoch of close approach. We cannot guess the period at the present time with any confidence, but it will probably be at least 200 years. The line of nodes should be near position angle 110° and the inclination of the orbit will be very large. The eccentricity is also large and the position of periastron may be near the node in the fourth quadrant.

Accurate observations, especially in distance, are required as early as possible. The following may represent the separation to 1880:—

1830, $1''.36$; 1855, $1''.04$; 1880, $0''.58$.

These give $p_3 = ''025$.

6842. $\beta 1111$. Spec. Ao. P.M. $-0^s.0046$, $-0''.025$ (Boss). This double star is the fainter member of the 6" pair $\Sigma 1835$. The following is a com-

parison of the Greenwich observations with Aitken's orbit (*Publ. Astr. Soc. Pacific.*, xxxi. 286):—

	Observed.	n.	Obs.—Comp.
1898.42	356.5	0.30	1 -20.5 $+0.3$
1899.30	28.8	0.25	1 $+7.6$ -0.3
1903.42	36.9	0.25	1 -3.3 -0.3
1909.43	56.9	0.15	1 -17.5 -0.7
1912.32	70.1	0.27	1 -31.9 $+1.0$
1915.46	131.6	0.15	2 -13.9 $.00$

The hypothetical parallax is $.016$. Abs. Trig. Par., $''018$ (2). Spec. Par., $''009$.

6851. $\Sigma 1837$. Spec. F2. P.M. $-0^s.0047$, $-0''.043$ (Boss). The position angle has decreased $27^\circ.5$ in 80 years at $1''.40$. $p_1 = ''018$.

6913. A. 570. Spec. Az. P.M. $-0^s.0055$, $-0''.048$ (Boss). From the observed angles we deduce:—

1903	200.9	0.26
1909	153.3	0.23
1915	91.4	0.20

The period may be only about 40 years. $p_1 = ''027$.

6948. $\Sigma 1863$. Spec. F2. P.M. $-0^s.0057$, $+0''.006$ (Boss). The position angle has decreased $20^\circ.7$ in 80 years at $0''.62$. $p_1 = ''007$.

6954. $\Sigma 1864$. π Boötis. Spec. Ao. P.M. $+0^s.0011$, $+0''.002$ for A and $-0^s.0013$, $+0''.006$ for B (Boss). The position angle has increased $7^\circ.3$ in 130 years at $5''.86$. $p_1 = ''023$.

6955. $\Sigma 1865$. ζ Boötis. Spec. Az. P.M. $+0^s.0038$, $-0''.027$ (Boss). The following is a comparison of the Greenwich observations with Hertzprung's orbit (*Astr. Nach.*, vol. 203, 393):—

	Observed.	n.	Obs.—Comp.
1893.49	284.7	0.44	3 -2.4 $+1.3$
1896.38	273.2	0.21	1 $+1.2$ $+0.7$
1897.41	258.0	..	1 $+11.5$ $..$
1898.44	252.4	0.1	2 $..$ $..$
1900.47	145.3	0.27	8 -13.1 $+0.7$
1901.39	151.1	0.34	5 -3.2 $+0.9$
1902.40	150.4	0.33	6 -0.8 $+0.2$
1903.37	146.1	0.34	6 -3.1 -0.1
1904.70	145.3	0.36	4 -1.7 -0.5
1906.94	145.9	0.44	7 $+1.5$ -0.5
1908.98	141.8	0.43	12 -1.0 -1.3
1911.24	137.6	0.56	11 -3.7 -0.7
1914.19	138.7	0.62	13 -1.1 -0.9

Hyp. Par., $''019$.

6958. $\Sigma 1867$. Spec. F5. P.M. $-0^s.0036$, $-0''.077$ (Greenwich, 1910). The position angle has decreased $8^\circ.8$ in 80 years at a mean separation of $1''.28$. The angle appears to have changed uniformly, but the distance has decreased from $1''.53$ in 1830 to $1''.11$ in 1910. $p_1 = ''008$.

6975. $\Sigma 1871$. Spec. Fo. The position angle has increased $11^\circ.5$ in 80 years at $1''.85$. $p_1 = ''013$.

6972. Hu. 575. More observations are required to prove if the observed motion is real.

6993. $\Sigma 1877.$ ϵ Boötis. Spec. Ao, Ko. P.M. $-0^s.0036, +0''.008$ (Boss). The observations are represented by :—

1830	321.3	2.63
1875	326.8	2.79
1920	332.1	2.88

These give $p_1 = .018, p_3 = .019$. Abs. Trig. Par., $.015$ (2). Spec. Par., $.019$.

6997. $\Sigma 1876.$ Spec. Go. The separation is increasing and the angular motion decreasing.

1833	52.0	1.09
1872	68.0	1.24
1911	80.0	1.44

The measures of distance are rather discordant. These positions give $p_1 = .016, p_3 = .018$.

6999. $\Sigma 1879.$ Spec. F8. P.M. $+0^s.0047, -0''.263$ (Porter). A new orbit is given later; hypothetical parallax, $.020$. Spec. Par., $.035$.

7001. $O\Sigma 285.$ Spec. F5. A new orbit is given later; hypothetical parallax, $.013$. Abs. Trig. Par., $-.022$ (1). Spec. Par., $.012$.

7013. $\Sigma 1883.$ Spec. F8. The relative motion is now rapid, as is indicated by :—

1830	271.0	1.08
1845	267.8	1.02
1860	264.0	0.92
1875	259.2	0.80
1890	252.2	0.63
1905	240.3	0.47
1914	228.1	0.37

From these positions we derive :—

	p_1	p_2	p_3
1830-1890	.011	.021	.016
1875-1914	.013	.012	.018

7034. $\Sigma 1888.$ ξ Boötis. Spec. G5. P.M. $+0^s.0092, -0''.106$ (Boss). The following is a comparison of the observations with Lohse's orbit (*Publ. Astroph. Obs. Potsdam*, xx, 114) :—

	Observed.	n.	Obs.—Comp.
1896.66	219.3	2.76	4 -2.0 -10
1898.89	211.3	2.82	4 +0.6 +05
1901.18	199.7	2.84	4 +0.5 +16
1902.72	190.7	2.54	7 -0.6 -09
1904.92	177.2	2.55	4 -1.8 -00
1908.44	154.1	2.35	4 -3.5 -03
1910.61	139.2	2.15	5 -3.7 -12
1912.99	123.0	2.16	5 -2.1 -02
1914.72	103.7	2.11	3 -7.8 -06
1917.44	86.1	1.80	2 -4.7 -45
1919.42	75.7	2.43	4 -1.6 +02

The hypothetical parallax from the orbit elements is $.134$. Abs. Trig. Par., $.178$ (2). Spec. Par., $.158$ for A and $.105$ for B. These indicate that the mass of the system is about the mass of the sun.

7044. $O\Sigma 287.$ Spec. Go. The observations are represented by :—

1843	92.1	0.45
1866	118.2	0.57
1889	134.6	0.72
1912	145.4	0.87

The period must be several centuries. For the next century at least the motion will be very slow. The above positions give :—

	p_1	p_2	p_3
1843-1889	.014	.012	.016
1866-1912	.013	.013	.016

7040. $\beta 31.$ Spec. Ko. P.M. $-0^s.0016, +0''.184$ (Porter). The position angle has increased $14^\circ.7$ in 40 years at $1''.45$. $p_1 = .020$.

7049. $O\Sigma 288.$ Spec. Go. The relative motion is now slow :—

1844	223.5	0.47
1856	206.6	0.82
1868	199.7	1.15
1892	192.3	1.53
1916	187.3	1.71

As the separation is still increasing, the period must be many centuries.

	p_1	p_2	p_3
1844-1868	.022	.025	.037
1868-1916	.016	.038	.026

7120. $\Sigma 1909.$ 44 Boötis. Spec. Go. P.M. $-0^s.0386, +0''.031$ for A, and $-0^s.0426, +0''.025$ for B (Boss). The following comparison is with Doberek's orbit (*Astr. Nach.*, 182, 27) :—

	Observed.	n.	Obs.—Comp.
1903.1	242.9	4.37	3 +0.1 -08
1906.8	244.8	4.50	4 +1.5 +21
1912.0	246.2	4.11	3 +2.3 +06

The hypothetical parallax of Doberek's orbit is $.082$. Spec. Par., $.072$ for A and $.066$ for B.

7119. $\Sigma 1907.$ Spec. Go. P.M. $+0^s.0020, -0''.095$ (Porter). The position angle has decreased $8^\circ.7$ in 80 years at $1''.11$. $p_1 = .007$.

7185. $\Sigma 3091.$ It is difficult to conclude anything about this pair except that it is now closer than when observed by Struve.

7191. $\Sigma 1926.$ There is no certain change in angle, but the separation appears to have decreased.

7212. $\Sigma 1934.$ Spec. G5. The positions deduced from the observations are :—

1830	45.3	5.28
1910	25.7	7.15

From the observations the change in both angle and separation has been proportional to the time. The extreme angles given above may both be too small. $p_1 = .064, p_3 = .079$.

7214. Σ1932. Spec. F8. P.M. +0^s.0053, +0["].080 (Greenwich, 1910). The angular motion of this binary is now about 2½ degrees a year and near a maximum. The whole of the first quadrant should be described in another 50 years or so, but the period must be many centuries. The observations are represented by the following positions:—

1830	273.9	1 ["] .62
1840	278.1	1 ["] .54
1850	282.9	1 ["] .44
1860	288.5	1 ["] .31
1870	295.4	1 ["] .19
1880	303.8	1 ["] .06
1890	314.6	0 ["] .92
1900	329.3	0 ["] .78
1910	350.0	0 ["] .66
1918	10.0	0 ["] .64

These give the hypothetical parallax as follows:—

	<i>p</i> ₁	<i>p</i> ₂	<i>p</i> ₃
1830-1870	" ["] .025	" ["] .034	" ["] .029
1870-1910	" ["] .030	" ["] .029	" ["] .030

7251. Σ1937. η Coronæ Borealis. Spec. G0. P.M. +0^s.0101, -0["].198 (Boss). A comparison of the observations with Lohse's orbit (*Publ. Astroph. Obs. Potsdam*, xx, 119) results as follows:—

	Observed.	n.	Obs.—Comp.
1893.50	244.8	0 ["] .85	2 +0 ["] .5 + ["] .39
1896.35	310.8	0 ["] .45	3 +1 ["] .5 + ["] .06
1897.34	329.1	0 ["] .40	4 +0 ["] .1 - ["] .05
1898.49	342.8	0 ["] .46	3 -2 ["] .0 - ["] .10
1899.36	352.7	0 ["] .61	4 -1 ["] .0 - ["] .02
1900.43	3.2	0 ["] .65	5 +1 ["] .5 - ["] .08
1901.36	7.5	0 ["] .73	4 +0 ["] .5 - ["] .07
1902.42	11.2	0 ["] .75	4 -0 ["] .9 - ["] .13
1903.40	14.9	0 ["] .89	3 -1 ["] .2 - ["] .05
1904.47	16.7	0 ["] .93	3 -3 ["] .3 - ["] .06
1908.48	29.0	1 ["] .13	2 -3 ["] .6 + ["] .06
1909.55	34.1	0 ["] .92	1 -1 ["] .8 - ["] .15
1910.52	37.5	1 ["] .08	3 -1 ["] .5 + ["] .03
1911.54	42.0	1 ["] .02	4 -0 ["] .3 - ["] .01
1912.54	40.3	1 ["] .08	4 -5 ["] .4 + ["] .09
1913.45	49.5	1 ["] .02	5 +0 ["] .4 + ["] .07
1914.45	49.7	0 ["] .93	6 -3 ["] .2 + ["] .03
1919.62	85.6	0 ["] .68	1 -0 ["] .1 + ["] .07

The hypothetical parallax from the elements is "["].059. Abs. Trig. Par., "["].084 (2). Spec. Par., "["].055.

7259. Σ1938. μ² Boötis. Spec. K0. P.M. -0^s.0122, +0["].093 (Boss). Boss gives the P.M. for μ Boötis, which is 108" distant, as -0^s.0126, +0["].078. The following comparison is with Lohse's orbit (*Publ. Astroph. Obs. Potsdam*, xx, 122):—

	Observed.	n.	Obs.—Comp.
1893.50	82.9	1 ["] .26	1 -5 ["] .8 + ["] .40
1898.49	77.4	0 ["] .93	7 -0 ["] .2 - ["] .01
1901.63	72.7	0 ["] .98	10 +1 ["] .2 - ["] .01
1904.54	66.8	1 ["] .10	7 +0 ["] .2 + ["] .05
1911.10	59.4	1 ["] .15	4 +2 ["] .2 - ["] .01
1914.23	54.2	1 ["] .25	5 +1 ["] .4 + ["] .05

The hypothetical parallax is "["].029. A new orbit is given later. Hyp. Par., "["].026. Abs. Trig. Par., "["].046 (3). Spec. Par., "["].035 for μ¹ Boötis and "["].032 for μ² Boötis.

7276. OΣ296. Spec. G5. P.M. +0^s.0104, -0["].082 (Porter). The position angle has decreased from 327[°].8 in 1845 to 301[°].5 in 1915. With a mean separation of 1["].61, *p*₁="["].022.

7273. Σ1944. Spec. F8. The position angle has decreased 16[°].8 in 80 years at a mean separation of 1["].25. It is possible that the separation is slowly decreasing. *p*₁="["].012.

7318. Σ1954. δ Serpentis. Spec. F0. P.M. -0^s.0046, +0["].008 (Boss). The following positions show the observed motion:—

1830	198 [°] .0	2 ["] .56
1870	191.2	3 ["] .32
1910	185.5	3 ["] .60

These positions give *p*₁="["].025, *p*₂="["].060, *p*₃="["].036. Abs. Trig. Par., "["].013 (1). Spec. Par., "["].028 for A and "["].018 for B.

7323. Σ1957. The decrease in position angle is slow and very uncertain.

7332. OΣ298. Spec. K0. P.M. -0^s.0396, +0["].041 (Porter). More than a revolution has now been observed. The following table shows the period between the repetition of a few position angles:—

			Period.
180 [°]	1899.6	1843.8	55.8 years.
185	1903.5	1847.1	56.4 "
190	1908.0	1851.4	56.6 "
195	1912.2	1856.4	55.8 "
200	1915.8	1860.6	55.2 "

Mean 55.96 years.

This agrees very well with the period, 56.65 years, of Celoria's orbit (*Astr. Nach.*, 119, 163), which has been used in the following comparison:—

	Observed.	n.	Obs.—Comp.
1897.47	176 [°] .2	0 ["] .97	9 -1 ["] .7 - ["] .17
1901.82	182.7	1 ["] .04	14 -0 ["] .1 - ["] .25
1907.05	189.8	1 ["] .22	10 +2 ["] .0 - ["] .13
1913.22	197.9	1 ["] .28	3 +4 ["] .4 ["] .00

The hypothetical parallax is "["].047. Abs. Trig. Par., "["].046 (1). Spec. Par., "["].055.

7352. Σ1965. ζ Coronæ. Spec. B8. P.M. -0^s.0009, -0["].008 (Boss). The position angle appears to be increasing about 4[°] per century at 6["].2. *p*₁="["].019.

7368. Σ1967. γ Coronæ. Spec. A0. P.M. -0^s.0075, +0["].030 (Boss). The following comparison of the observations is with Doberck's orbit (*Astr. Nach.*, 179, 385):—

	Observed.	n.	Obs.—Comp.
1897.5	118 [°] .9	0 ["] .51	10 -1 ["] .2 - ["] .10
1900.8	117.2	0 ["] .46	17 -0 ["] .8 - ["] .17
1906.2	117.6	0 ["] .60	11 +3 ["] .0 ["] .00
1910.9	114.2	0 ["] .62	17 +3 ["] .1 + ["] .13
1914.3	115.3	0 ["] .64	8 +9 ["] .0 + ["] .29
1919.6	113.2	0 ["] .64	1

It will be seen that the companion has not yet reached the position in which it was observed by Struve in 1826. All the recent determinations of the period are therefore too small. It certainly exceeds 95 years, and it is unlikely that it is less than 100 years. The maximum separation does not appear to have been reached before 1910. There is no need to make a new determination of the orbit till the companion has passed into the first quadrant. This pair should be carefully observed at the present time, as a rapid change may soon take place.

The hypothetical parallax is $''\cdot026$. Abs. Trig. Par., $''\cdot030$ (3).

7367. $\beta 619$. Spec. G5. The position angle has increased $12^\circ\cdot6$ in 30 years at $0''\cdot50$. $p_1 = ''\cdot007$.

7375. $\Sigma 1969$. Spec. Ko. The following positions show the observed change in distance, and the angular motion has been adjusted to fit.

1830	42 $^\circ$ 0	1 $''$ 47
1869	45 $^\circ$ 4	1 $''$ 03
1908	54 $^\circ$ 0	0 $''$ 60

$p_1 = ''\cdot008$, $p_3 = ''\cdot020$.

7381. Pritchett = Ku. 51. The separation appears to be increasing.

7414. $\beta 621$. Spec. A0. The position angle has decreased $18^\circ\cdot1$ in 30 years at $0''\cdot54$. $p_1 = ''\cdot010$.

7440. $\Sigma 1988$. Spec. F2. The position angle appears to have decreased $5^\circ\cdot3$ in 80 years at $2''\cdot74$. $p_1 = ''\cdot012$.

7477. $O\Sigma 303$. Spec. F5. The observed motion is indicated by:—

1845	112 $^\circ$ 3	0 $''$ 60
1881	134 $^\circ$ 5	0 $''$ 75
1917	150 $^\circ$ 0	0 $''$ 86

These give $p_1 = ''\cdot013$, $p_3 = ''\cdot014$.

7490. $\Sigma 2006$. Spec. A3. The position angle has decreased $10^\circ\cdot6$ in 80 years at $1''\cdot64$. $p_1 = ''\cdot011$.

7487. $\Sigma 1998$. ξ^1 Scorpii. Spec. F8. P.M. $-0^s\cdot0042$, $-0''\cdot034$ (Boss). ξ^2 Scorpii has a proper motion of $-0^s\cdot0051$, $-0''\cdot028$ (Boss). The following comparison is with Aitken's orbit (*Publ. Lick. Obs.*, xii, 102):—

	Observed.	n.	Obs.—Comp.		
1907 \cdot 56	101 $^\circ$ 2	0 $''$ 28	2	-12 $^\circ$ 5	- $''$ 05
1908 \cdot 40	119 $^\circ$ 1	0 $''$ 27	1	-8 $^\circ$ 8	- $''$ 13
1909 \cdot 51	139 $^\circ$ 5	0 $''$ 35	2	-1 $^\circ$ 2	- $''$ 15
1910 \cdot 50	143 $^\circ$ 6	0 $''$ 47	2	-4 $^\circ$ 9	- $''$ 13
1911 \cdot 41	155 $^\circ$ 0	0 $''$ 56	2	+1 $^\circ$ 0	- $''$ 11
1912 \cdot 46	163 $^\circ$ 8	0 $''$ 71	3	+4 $^\circ$ 8	- $''$ 04
1915 \cdot 41	167 $^\circ$ 2	0 $''$ 78	1	-2 $^\circ$ 1	- $''$ 14

The hypothetical parallax is $''\cdot045$. Abs. Trig. Par., $''\cdot046$ (2). Spec. Par., $''\cdot044$ for the close pair, $''\cdot036$ for ξ^2 .

7495. $\beta 948$. Spec. F5. The position angle has decreased $5^\circ\cdot3$ in 20 years at $1''\cdot50$. Further observations are required. $p_1 = ''\cdot016$.

7500. $\Sigma 2007$. The separation has increased from $32''\cdot09$ in 1830 to $34''\cdot85$ in 1910. This is probably due to difference in the proper motions of the two stars.

7505. $\beta 812$. Spec. F5. The position angle has decreased $7^\circ\cdot0$ in 30 years at $0''\cdot80$. $p_1 = ''\cdot008$.

7506. $\beta 949$. See Aitken (*Publ. Lick. Obs.*, vol. xii, 104).

7514. $\Sigma 2010$. κ Herculis. Spec. G5, K2. P.M. $-0^s\cdot0031$, $-0''\cdot014$ for A and $-0^s\cdot0020$, $-0''\cdot039$ for B (Boss). The position angle appears to have increased about $1^\circ\cdot9$ in 100 years, while the separation has decreased from $31''\cdot27$ in 1830 to $29''\cdot52$ in 1900. The total relative motion is $2''\cdot7$ per century. The assumption that this is a physical system leads to a parallax of over $0''\cdot1$. Observations show that the parallax is negligibly small, so that the system is optical. Abs. Trig. Par., $-''\cdot011$ (1). Spec. Par., $''\cdot008$ for both components.

7540. $\Sigma 2016$. The position angle has decreased $3^\circ\cdot2$ and the separation increased from $6''\cdot9$ to $7''\cdot3$ in 75 years. $p_1 = ''\cdot023$, $p_3 = ''\cdot029$.

7552. $\Sigma 2022$. Spec. F2. P.M. $+0^s\cdot0050$, $-0''\cdot035$ (Greenwich, 1910). The position angle has increased 10° at a separation of $2''\cdot71$ in 80 years. $p_1 = ''\cdot018$.

7551. $\Sigma 2021$. 49 Serpentis. Spec. Ko. P.M. $+0^s\cdot0116$, $-0''\cdot427$ (Boss). The maximum separation appears to have been nearly reached. There are observations by Herschel in 1783 and 1803 which fit on with the later ones. Herschel's angles are adopted and the separation has been adjusted to give a constant rate of description of area. Herschel gave the distance as less than $2''$.

1783 \cdot 2	291 $^\circ$ 5	2 $''$ 07
1803 \cdot 3	304 $^\circ$ 3	2 $''$ 58
1834 \cdot 0	316 $^\circ$ 5	3 $''$ 25
1854 \cdot 0	322 $^\circ$ 4	3 $''$ 55
1874 \cdot 0	327 $^\circ$ 6	3 $''$ 76
1894 \cdot 0	332 $^\circ$ 2	3 $''$ 90
1914 \cdot 0	336 $^\circ$ 6	3 $''$ 95

Using the positions 1834–1914, $p_1 = ''\cdot040$, $p_2 = ''\cdot061$, $p_3 = ''\cdot042$. Abs. Trig. Par., $''\cdot078$ (1). Spec. Par., $''\cdot035$ for S star and $''\cdot026$ for N Star.

7554. $\Sigma 2023$. Spec. F5. The position angle has decreased 9° in 80 years at $1''\cdot72$. $p_1 = ''\cdot011$.

7563. $\Sigma 2032$. σ Coronæ Borealis. Spec. F5. P.M. $-0^s\cdot0232$, $-0''\cdot093$ (Boss). The following com-

parison of the Greenwich observations is with Doberck's orbit (*Astr. Nach.*, 169, 289):—

	Observed.	n.	Obs.—Comp.
1899.5	212.6 4.46	10	+0.2 +.05
1912.3	217.5 4.95	13	+0.4 +.05
1919.6	216.7 5.04	2	-2.7 -.12

The orbit must remain uncertain for a long time. For the past 20 years Doberck's orbit gives a relative motion of only 7°, and this is steadily decreasing. The stars C and D are only optical members of the system.

Hyp. Par., ".051. Abs. Trig. Par., ".044 (2). Spec. Par., ".038 for A and ".032 for B.

7561. Σ2026. Spec. K5. The following comparison is with Aitken's orbit (*Publ. Lick. Obs.*, xii, 105):—

	Observed.	n.	Obs.—Comp.
1897.90	263.2 0.79	2	+10.9 +.14
1904.97	201.1 0.68	2	- 0.2 +.10
1907.50	188.7 0.50	2	+ 5.4 -.05
1919.46	104.3 0.29	1	.. ..

Further observations of this pair at the present time are greatly to be desired. The final observation is 50° different from the computed position.

7587. OΣ309. Spec. A5, G. The position angle has increased 24°.8 in 70 years at 0".43. $p_1 = ".006$.

7619. β951. The position angle has decreased 9°.5 in 30 years at 0".92. $p_1 = ".011$.

7632. Σ2054. Spec. G5. P.M. -0s.0050, +0".032 (Boss). The position angle has decreased 11°.6 in 80 years at 1".06. $p_1 = ".008$.

7634. OΣ312. η Draconis. Spec. G5. P.M. -0s.0025, +0".059 (Boss). The separation has increased from 4".6 in 1845 to 5".4 in 1915. $p_3 = ".034$. Abs. Trig. Par., ".019 (2). Spec. Par., ".036.

7636. OΣ311. The star C is only an optical member of the system. The following comparison of the Greenwich observations of the AC system is with Hussey's ephemeris (*Publ. Lick. Obs.*, v, 135):

	Observed.	n.	Obs.—Comp.
1905.5	205.3 6.27	7	-1.7 +.06

7640. β815. This is an optical double star.

7637. Σ2049. Spec. A3. P.M. -0s.0012, -0".001 (Greenwich, 1910). The position angle has decreased 11°.8 in 85 years at 1".13. $p_1 = ".008$.

7642. Σ2052. Spec. G5. P.M. -0s.0229, +0".390 (Porter). An orbit has been computed and is given later. Hyp. Par., ".045. Abs. Trig. Par., 088 (1). Spec. Par., ".058.

7649. Σ2055. λ Ophiuchi. Spec. Ao. P.M. -0s.0032, -0".084 (Boss). A new orbit, explaining the early observations of Herschel, has been computed and is given later. Hyp. Par., ".046. Abs. Trig. Par., ".005 (3).

7651. Σ3105. Spec. Ao. The position angle has decreased uniformly 29°.0 in the 45 years to 1914. Struve's angles are not consistent with uniform angular motion. The mean separation has been 0".43. $p_1 = ".008$.

7673. OΣ313. Spec. G5. The position angle has decreased 13°.0 in 70 years at 0".86. $p_1 = ".007$.

7703. Σ2078. 17 Draconis. Spec. Ao. P.M. -0s.0010, +0".020 (Boss). The position angle has decreased 5°.0 in 80 years at 3".68. $p_1 = ".015$.

7708. Σ2080. The relative motion of this pair is shown by:—

1830	29.3	5.62
1910	25.1	2.86

This may be an optical pair. In any case it will become very close and difficult.

7717. Σ2084. ζ Herculis. Spec. Go. P.M. -0s.0365, +0".385 (Boss). The following comparison is with Doberck's orbit (*Astr. Nach.*, 144, 241):—

	Observed.	n.	Obs.—Comp.
1894.54	40.4 1.24	2	+ 1.0 +.20
1895.44	37.9 0.67	1	+ 9.7 -.20
1896.46	6.0 0.54	2	- 2.3 -.14
1897.40	2.3 0.45	3	+26.0 -.08
1898.64	287.8 0.57	6	+ 4.1 .00
1899.46	263.2 0.61	11	+ 3.0 -.08
1900.66	236.1 0.75	9	- 1.9 -.13
1901.58	224.8 0.91	22	- 0.9 -.06
1902.56	216.0 1.01	10	+ 1.2 -.03
1903.49	199.7 0.96	3	- 5.8 -.13
1904.52	190.3 1.27	4	- 5.5 +.15
1905.52	187.1 1.40	2	+ 0.3 +.27
1906.52	176.1 1.10	6	- 2.0 -.05
1907.52	167.7 1.15	9	- 1.8 -.02
1908.67	159.3 1.16	14	- 0.7 -.03
1909.62	151.6 1.12	2	- 0.9 -.09
1910.71	144.6 1.26	3	+ 0.4 +.02
1911.57	138.9 1.16	8	+ 0.9 -.11
1912.56	126.4 1.25	6	- 4.8 -.06
1913.62	122.2 1.26	2	- 2.2 -.09
1914.48	111.3 1.37	4	- 7.8 -.02
1915.55	108.5 1.26	2	- 4.4 -.17
1917.60	100.5 1.36	2	- 1.7 -.15
1919.60	88.3 1.59	1	- 4.2 +.03

Hyp. Par., ".101. Abs. Trig. Par., ".114 (5). Spec. Par., ".076.

7739. Σ2094. Spec. F2. The position angle has decreased 5°.0 in 80 years at 1".46. $p_1 = ".006$.

7748. Δ15. Spec. K5. A new orbit has been computed and is given later.

7751. Σ2097. Spec. G5. The position angle has decreased $6^{\circ}.9$ in 80 years at $2''.07$. $p_1 = ".011$.

7759. Σ2101. Spec. G0. The position angle has decreased $6^{\circ}.0$ in 80 years at $4''.33$. $p_1 = ".020$.

7779. β627. 52 Herculis. Spec. A2p. P.M. $+0^s.0021$, $-0''.073$ (Boss). The position angle has increased $25^{\circ}.0$ in 40 years at $1''.79$. $p_1 = ".035$.

7778. Σ2106. Spec. F8. This is a difficult system to deal with. The observed angles and distances when plotted against the time and then used to give a smooth curve gave the following positions :—

			$rr^1d\theta$
1826	338.8	1.04	5.7
1846	332.6	0.88	5.3
1866	324.0	0.70	3.6
1886	314.0	0.51	3.2
1896	306.6	0.42	3.0
1906	295.8	0.33	2.7
1911	289.0	0.30	3.1
1916	279.0	0.26	

In the above table the value of $rr^1d\theta$ is given for 20-year intervals. It will be seen that the rate of description of area is not nearly constant. The observed separation about 1896 was even smaller than that given above. The following adjustment may be approximately correct :—

1826	337.8	0.92
1846	332.9	0.78
1866	325.7	0.63
1886	314.3	0.49
1896	306.0	0.43
1906	294.6	0.36
1911	287.2	0.33
1916	278.3	0.30

This pair requires observation at the present time. Abs. Trig. Par., $".001$ (1). Spec. Par., $".017$.

These positions give the following values of the hypothetical parallax :—

	p_1	p_2	p_3
1826-1866	.009	.012	.015
1866-1906	.011	.010	.014
1896-1916	.012	.010	.014

7777. OΣ315. 21 Ophiuchi. Spec. A0. P.M. $-0^s.0008$, $-0''.026$ (Boss). The position angle has decreased 15° in 60 years at $0''.85$. $p_1 = ".009$.

7783. Σ2107. Spec. F5. P.M. $+0^s.0012$, $+0''.024$ (Greenwich, 1910). A new orbit with a hypothetical parallax of $".022$ has been computed. Abs. Trig. Par., $".024$ (3). Spec. Par., $".022$.

7817. Σ3107. Spec. G0. The position angle has decreased $17^{\circ}.6$ in 80 years at $1''.36$. $p_1 = ".013$.

7834. Σ2118. 20 Draconis. Spec. F0. P.M. $-0^s.0072$, $+0''.030$ (Boss). There is no doubt that this is a true binary although the apparent orbit is so far nearly rectilinear. The apparent speed along the path has varied with the separation. The following positions represent the observations very well

and give practically constant rate of description of area :—

1830	247.0	0.86
1850	243.2	0.68
1870	235.0	0.40
1880	220.0	0.20
1890	136.0	0.11
1900	94.7	0.26
1910	84.7	0.37
1912	82.8	0.40

The observations of Burnham in 1889, 1891, 1892 seem to be substantially correct in both position angle and separation. The inclination of the orbit to the tangent plane will be large, with the node near 70° . The maximum separation in the first quadrant will probably prove considerably smaller than that in the third. The eccentricity may be less than 0.3. It is impossible at present to say more about the period than that it must exceed 200 years and that it is probably twice as great.

	p_1	p_3
1830-1870	.008	.018
1870-1890	.015	.018
1890-1912	.015	.017

7831. Σ2117. Observations are not very numerous, but they indicate decrease of $11^{\circ}.7$ in the position angle during the 70 years to 1900. Separation, $1''.35$. $p_1 = ".011$.

7837. Σ2114. Spec. A0. The observed motion is represented by :—

1830.0	135.8	1.26
1860.0	146.6	1.29
1890.0	157.3	1.27
1912.5	166.6	1.17

These positions give :—

	p_1	p_2	p_3
1830-1890	.017	.022	.017
1860-1912.5	.018	.026	.018

7858. Σ2120. Spec. K0. P.M. $-0^s.0015$, $+0''.005$ (Greenwich, 1910). This is an optical pair not requiring further observation at present. The change is principally due to the proper motion of the faint star.

7863. β823. Spec. G0. The position angle has increased $21^{\circ}.0$ in the 24 years to 1905. The mean separation has been $1''.03$, but this is probably decreasing. $p_1 = ".025$.

7878. Σ2130. μ Draconis. Spec. F5. P.M. $-0^s.0083$, $+0''.081$ (Boss). The following positions referred to the equinox of 1900 show the relative motion :—

1805	217.3	3.85
1820	210.5	3.54
1835	202.4	3.24
1850	192.6	2.96
1860	185.1	2.80
1870	176.9	2.68
1880	167.9	2.57
1890	158.1	2.47
1900	147.6	2.40
1910	136.7	2.38

With regard to Herschel's observation of 1781, the distance 4".35 is probably nearly correct, but the position angle is about 5° too large. The period should be of the order of 600 or 800 years.

	p_1	p_2	p_3
1805-1850	".060	".056	".068
1850-1890	".064	".057	".066
1870-1910	".066	".055	".067

Spec. Par., ".028 for the S. and ".026 for the N. star.

13364. Hu. 1176. It does not appear satisfactory to combine the separate observations which do not agree well with those made by Aitken (*Publ. Lick. Obs.*, xii. 113). This is undoubtedly a rapid binary.

7885. β 1118. η Ophiuchi. Spec. Az. P.M. +0^s.0025, +0".086 (Boss). The following positions are based on rather slight material:—

1890	273.1	0.33
1895	263.3	0.385
1900	255.9	0.44
1905	250.1	0.49
1910	245.3	0.53
1915	241.1	0.565

	p_1	p_2	p_3
1890-1900	".015	".015	".019
1895-1915	".014	".019	".017

7898. Σ 2135. Spec. Ko. The motion is indicated by:—

1830	166.1	6.70
1910	179.3	7.22

From these we derive $p_1 = ".055$, $p_3 = ".057$.

7914. Σ 2140. α Herculis. Spec. Mb. P.M. -0^s.0008, +0".027 for A, -0^s.0004, +0".031 for B (Boss). The position angle has decreased 6° in 80 years at 4".66. $p_1 = ".022$. Abs. Trig. Par., -".004 (2). Spec. Par., ".007 for α^1 (Spec. Mb) and ".018 for α^2 (Spec. F9).

7922. Σ 3127. δ Herculis. Spec. A. P.M. -0^s.0018, -0".163 (Boss). This is probably an optical pair, in which case the faint star has a large proper motion. Abs. Trig. Par., ".027 (2).

7936. O Σ 327. Spec. Mb. This is a binary, with a period about 88 years (or about double this). A probable orbit is given later. Hyp. Par., ".010. From the positions:—

1891	301.3	0.22
1898	313.6	0.32
1905	320.6	0.38
1912	326.0	0.42

we derive $p_1 = ".010$, $p_3 = ".014$.

7935. H. C. Wilson 15. The star C, forming Σ 2145 with AB, is merely an optical member of the system. There has been no observed change in the close pair in 20 years.

7955. β 628. The position angle has decreased 16° in 30 years at 0".51. $p_1 = ".009$.

7965. Σ 2153. Spec. Ko. There has been a decrease in the position angle of 17° in 80 years at 1".94. $p_1 = ".019$.

8004. Σ 2163. The position angle has decreased 14° in 80 years at 1".50. $p_1 = ".012$.

8003. Σ 2161. ρ Herculis. Spec. Ao. P.M. -0^s.0032, -0".004 (Boss). The increase in position angle has amounted to 5° in 80 years. Separation 3".83. $p_1 = ".017$.

8008. β 1250. P.M. +0^s.0006, -0".003 (Greenwich, 1910). The position angle has increased 13° in 30 years at 1".98. $p_1 = ".030$.

8017. Σ 2165. Spec. Fo. P.M. +0^s.0015, -0".023 (Greenwich, 1910). The relative motion is shown by:—

1830	45.5	6.67
1910	55.2	8.20

This may be an optical pair. If physical, $p_1 = ".048$, $p_3 = ".066$.

8028. Σ 2170. The position angle has decreased 9° in 70 years at 3".73. $p_1 = ".025$.

8038. Σ 2173. Spec. G6. P.M. -0^s.0083, -0".175 (Boss). The following comparison of Greenwich observations is with Aitken's orbit (*Publ. Lick. Obs.*, xii. 116):—

	Observed.	n.	Obs.—Comp.
1895.56	336.8	1.14	4 - 0.1 - .03
1898.95	335.0	1.09	6 + 1.4 - .11
1901.59	328.3	0.95	10 - 2.5 - .14
1906.73	316.6	0.55	6 - 3.7 - .04
1909.58	279.4	0.27	2 - 7.9 + .06
1911.53	211.3	0.19	3 + 18.5 - .08
1912.66	185.3	0.25	3 + 11.3 - .13
1915.20	159.4	0.61	3 - 1.7 - .07

The hypothetical parallax of Aitken's orbit is ".066. Abs. Trig. Par., ".065 (2). Spec. Par., ".063.

8055. O Σ 331. Spec. B8. The position angle has increased 10° in 65 years at 0".98. $p_1 = ".008$.

8099. β 962. 26 Draconis. Spec. Go. P.M. +0^s.0344, -0".508 (Boss). This binary has been investigated by Russell (*Publ. Amer. Astr. Soc.*, iii. 329, or *Pop. Astr.*, xxv. 667), who gives two orbits. The following ephemerides have been computed from Russell's orbits:—

	Orbit I. $e = .23$.		Orbit II. Circular.	
1880	153.9	1.350	152.6	1.341
1885	144.7	1.184	143.1	1.146
1890	130.6	0.884	127.5	0.815
1895	99.2	0.552	89.5	0.502
1900	38.0	0.527	28.7	0.575
1905	3.4	0.856	0.4	0.923
1910	349.0	1.204	347.5	1.223
1915	340.6	1.466	338.8	1.364
1920	334.3	1.624	330.7	1.313
1925	328.9	1.680	320.5	1.058
1930	323.5	1.648	302.0	0.736

The Greenwich observations for 1911-1 give a separation of $0^{\circ}.94$ against $1^{\circ}.27$ for both the orbits, while the position angle is $3^{\circ}.5$ greater than that shown by first orbit and $4^{\circ}.9$ greater than that shown by second. Accurate observations of the separation should soon discriminate between the two sets of elements.

The mean of the hypothetical parallaxes is $^{\circ}.057$. Abs. Trig. Par., $^{\circ}.084$ (4). Spec. Par., $^{\circ}.055$.

8100. $\beta 631$. Spec. A α . The position angle has decreased $14^{\circ}.0$ in 30 years at $0^{\circ}.39$. $p_1 = ^{\circ}.006$.

8107. $\Sigma 2192$. Spec. K α . P.M. $+0^{\circ}.0024$, $-0^{\circ}.097$ (Greenwich, 1910). This is an optical pair.

8118. $\Sigma 2199$. Spec. F γ . The position angle has decreased from $116^{\circ}.8$ to $84^{\circ}.6$ in the 80 years to 1910. Separation, $1^{\circ}.59$. $p_1 = ^{\circ}.023$.

8120. $\beta 1251$. Spec. F γ . P.M. $-0^{\circ}.0002$, $+0^{\circ}.096$ (Boss). The position angle has decreased $24^{\circ}.8$ in 20 years at $1^{\circ}.31$. $p_1 = ^{\circ}.040$. Abs. Trig. Par., $^{\circ}.031$ (1).

8127. $\Sigma 2203$. Spec. A α . P.M. $-0^{\circ}.0011$, $+0^{\circ}.012$ (Boss). The position angle has decreased $18^{\circ}.3$ in 80 years at $0^{\circ}.70$. $p_1 = ^{\circ}.007$.

8145. $\Sigma 2218$. Spec. F γ . P.M. $+0^{\circ}.0014$, $+0^{\circ}.128$ (Porter). The position angle has decreased $12^{\circ}.8$ in 80 years at $2^{\circ}.30$. $p_1 = ^{\circ}.018$.

8153. $\Sigma 2205$. Spec. K α . The observations indicate motion as follows:—

1830	290.9	2.52
1910	308.8	2.04

These positions give $p_1 = ^{\circ}.022$, $p_3 = ^{\circ}.025$.

8167. $\Sigma 2225$. Spec. K α . The position angle has decreased $10^{\circ}.0$ in 80 years at $9^{\circ}.00$. $p_1 = ^{\circ}.059$.

8162. A. Clark 7. μ Herculis. Spec. Mb. P.M. $-0^{\circ}.0244$, $-0^{\circ}.750$ (Boss). The Greenwich observations of the close pair are compared below with Aitken's orbit (*Publ. Lick. Obs.*, xii. 119):—

	Observed.	n.	Obs.—Comp.		
1896-19	45.5	1.42	3	-0.2	+1.0
1901-90	62.2	1.53	3	+0.6	-0.2
1904-58	68.0	1.60	2	-1.0	+1.1
1907-56	79.9	1.18	3	+1.0	-1.1

Hyp. Par., $^{\circ}.084$. Abs. Trig. Par., $^{\circ}.105$ (5). Spec. Par., $^{\circ}.110$.

8163. $\Sigma 2215$. Spec. A α . P.M. $-0^{\circ}.0008$, $-0^{\circ}.027$ (Boss). It is rather difficult to adjust the observations, as the angular motion indicates a larger decrease in the separation than the measures

warrant. The following positions may represent the actual motion:—

1830	312.0	0.80
1872	301.4	0.77
1914	287.6	0.63

These positions give $p_1 = ^{\circ}.009$.

8186. $O\Sigma 337$. Spec. F α . The observations are represented by:—

1843	307.7	0.50
1876	292.6	0.46
1909	271.6	0.35

The angular motion is steadily increasing. $p_1 = ^{\circ}.008$, $p_2 = ^{\circ}.011$, $p_3 = ^{\circ}.008$.

8203. $\Sigma 2236$. Spec. G α . The position angle has increased $4^{\circ}.1$ in 80 years at $3^{\circ}.12$. $p_1 = ^{\circ}.011$.

8210. $O\Sigma 338$. Spec. K α . The angular motion appears to be decreasing more than required to satisfy the observed increase in separation. The following positions make a compromise:—

1845	38.0	0.63
1880	22.6	0.75
1915	11.4	0.87

These give $p_1 = ^{\circ}.010$, $p_3 = ^{\circ}.012$.

8228. A. Clark 8. Spec. A γ . P.M. $+0^{\circ}.0010$, $-0^{\circ}.012$. (Greenwich, 1910). The position angle appears to have increased $14^{\circ}.0$ in 40 years at $0^{\circ}.32$. $p_1 = ^{\circ}.004$.

8230. A. 235. This pair has been noted by Aitken (*Publ. A. S. P.*, xxvii. 230), as showing an increase in position angle of $20^{\circ}.2$ in 14.2 years. The motion deduced from all the observations is $25^{\circ}.5$ in 15 years. The mean separation has been $0^{\circ}.31$. $p_1 = ^{\circ}.012$.

8242. $O\Sigma 339$. Spec. G γ . The motion is represented by:—

1845	183.1	2.63
1905	178.4	3.20

These positions give $p_1 = ^{\circ}.014$, $p_3 = ^{\circ}.027$.

8241. $\Sigma 2244$. Spec. A α . The position angle has increased $5^{\circ}.7$ in 80 years at $1^{\circ}.07$. $p_1 = ^{\circ}.005$.

8245. Ho. 72. Burnham has made a special study of this system, and has found a motion of $0^{\circ}.250$ in $359^{\circ}.7$ annually of B with respect to the stars A and C.

8303. $\Sigma 2262$. τ Ophiuchi. Spec. F. P.M. $+0^{\circ}.0014$, $-0^{\circ}.040$ (Boss). Comparison of observations with Doberck's orbit (*Astr. Nach.*, 170, 101):—

	Observed.	n.	Obs.—Comp.		
1900.2	258.6	1.90	5	+1.6	-0.2
1906.0	259.2	1.67	4	+0.7	-0.28
1913.6	262.1	1.88	4	+1.7	-0.8

Hyp. Par., $^{\circ}.028$.

8321. $\Sigma 2267$. Spec. A3. The position angle has increased $9^{\circ}.2$ in 80 years at a mean separation of $1''.18$. $p_1 = ".007$.

8326. Ho. 565. P.M. $+0^s.0017$, $+0''.008$ (Greenwich, 1910). The position angle has apparently increased $12^{\circ}.1$ in 20 years at $0''.37$. $p_1 = ".007$.

8331. $\beta 1127$. Spec. F2. The position angle appears to have decreased $11^{\circ}.7$ in 20 years at $0''.85$. $p_1 = ".016$.

8337. $\Sigma 2275$. The position angle has increased $7^{\circ}.8$ in 80 years at $0''.87$. The separation may have decreased. $p_1 = ".005$.

8340. $\Sigma 2272$. 70 Ophiuchi. Spec. Ko, K6. P.M. $+0^s.0169$, $-1''.102$ (Boss). The comparison of the observations is with Lohse's orbit (*Publ. Astroph. Obs. Potsdam*, xx. 141):—

	Observed.	n.	Obs.—Comp.
1893.69	308.9	2.34	1 -2.7 +.03
1895.69	295.9	2.65	1 -1.5 +.40
1896.62	289.2	2.22	13 -0.8 +.08
1897.53	282.5	1.97	9 +0.6 -.04
1898.55	272.4	1.81	11 +1.0 -.03
1899.54	260.7	1.65	11 +1.3 -.05
1900.57	246.4	1.61	9 +1.8 +.02
1901.60	226.5	1.58	10 -1.8 +.04
1902.55	212.2	1.67	9 -1.3 +.06
1903.56	198.1	1.74	14 -1.3 +.02
1904.53	188.9	1.98	11 +1.0 +.06
1905.56	178.2	2.10	12 -0.1 -.05
1906.60	170.6	2.32	11 0.0 -.11
1907.60	164.5	2.62	16 -0.2 -.08
1908.63	158.5	2.89	21 -1.3 -.09
1909.57	154.6	3.18	12 -1.4 -.05
1910.61	151.6	3.38	9 -0.9 -.13
1911.53	148.3	3.55	13 -1.5 -.20
1912.63	145.7	3.79	12 -1.4 -.24
1913.65	143.8	4.11	12 -1.0 -.15
1914.64	140.2	4.27	10 -2.5 -.21

The measured distances seem to be on the whole smaller than the computed. For the proper motions of the neighbouring stars see article by Comstock, A.J. 764.

Hyp. Par., $".183$. Abs. Trig. Par., $".187$ (5). Spec. Par., $".200$ for brighter star (Spec. Ko) and $".174$ for fainter (Spec. K4).

8353. $O\Sigma 341$. Continuous observation of this pair is required to reveal the motion.

8372. A. Clark 15. 99 Herculis. Spec. F8. P.M. $-0^s.0073$, $+0''.063$ (Boss). The following is a comparison of the observations with Lohse's orbit (*Publ. Astroph. Obs. Potsdam*, xx. 158):—

	Observed.	n.	Obs.—Comp.
1898.00	308.1	0.93	5 -5.1 -.21
1902.49	317.2	1.20	2 -8.2 -.13
1913.56	345.7	1.53	2 -2.2 -.01

Hyp. Par., $".062$. Abs. Trig. Par., $".045$ (5). Spec. Par., $".069$.

8368. $\beta 826$. The position angle appears to have decreased 11° in 20 years at $0''.68$. Further observations are required. $p_1 = ".012$.

8370. $O\Sigma 524$. Spec. A2. The position angle has decreased $33^{\circ}.0$ in 60 years at $0''.34$. $p_1 = ".006$.

8380. $\Sigma 2281$. 73 Ophiuchi. Spec. F2. P.M. $+0^s.0025$, $-0''.012$ (Boss). A new orbit has been computed with hypothetical parallax of $".019$.

8384. $\Sigma 2283$. Spec. F5. The position angle has decreased $10^{\circ}.3$ in 80 years at $1''.02$. $p_1 = ".007$.

8398. $\Sigma 2289$. Spec. F2, A0. The position angle has decreased $12^{\circ}.7$ in 80 years at $1''.12$. $p_1 = ".009$.

8421. $\Sigma 2292$. Spec. A2. P.M. $+0^s.0013$, $-0''.012$ (Greenwich, 1910). The position angle has increased $6^{\circ}.6$ in 80 years at $1''.20$. $p_1 = ".006$.

8428. $\Sigma 2295$. P.M. $+0^s.0006$, $-0''.014$ (Greenwich, 1910). The separation has decreased about $1''.5$ since Struve's observations. It is impossible to say whether this is due to difference of proper motions or not.

8433. $\Sigma 2294$. Spec. F2. The following positions show the motion observed between 1830 and 1875:—

	1830	1860	1875
$92^{\circ}.0$			
$1''.04$			
88.8			
0.79			
85.8			
0.55			

Thereafter the motion is rather uncertain till 1896. In the interval some 340° of position angle were described. By 1884 the separation had probably decreased to $0''.35$; between 1896 and 1911 it increased from about $0''.17$ to $0''.50$. It is impossible to give any reliable estimate of what separation was reached in position angle 270° , but it probably did not exceed $0''.25$. The minimum separations would occur about 1890 and 1894, and would be well under $0''.1$. The plane of the orbit must pass nearly through the line of sight. The period cannot be under two centuries and may be much longer. The maximum separation will probably exceed the $1''.06$ observed by Struve in 1831. The change of distance, 1830–1875, gives $p_3 = ".021$, and 1896–1911, $p_3 = ".021$.

8486. A.G. 219. The measures by Miller and the estimate in the A.G.C. (Albany) agree in giving the separation as $7''$. The two Greenwich observations agree in giving $2''.9$. Possibly the Greenwich observations refer to a different object as a change of 1 revolution in the screw would give the separation as $8''.9$, which also does not agree with the previous measures. On both nights the star was observed immediately after β G.C. 8484 = A.G. 218.

8485. $\Sigma 2303$. Spec. F5. The change has been mostly in distance. It was probably near a maximum of $3''.3$ in 1830. By 1910 it had decreased to $2''.2$. This pair should be carefully measured. $p_3 = ''\cdot 033$.

8507. $\beta 640$. Spec. G5. P.M. $+0^s\cdot 0049$, $+0''\cdot 085$ (Greenwich, 1910). The position angle has decreased $16^\circ\cdot 5$ in 30 years at $2''\cdot 30$. $p_1 = ''\cdot 041$.

8512. $\Sigma 2311$. This is probably an optical pair.

8545. Ho. 84. The seven observations for which a mean is given were originally described as Ho. 84. Most of the nine observations given in the catalogue as belonging to a new pair were also originally described as Ho. 84. These were correctly described, and the position angle was later altered 180° . All the observations appear to belong to the same pair, except, perhaps, the observation of 1906.731. Neglecting this we get:—

	1900.8	$318^\circ\cdot 7$	$4''\cdot 51$	8
	1905.8	$318^\circ\cdot 5$	$3''\cdot 76$	7
or	1903.2	$318^\circ\cdot 6$	$4''\cdot 16$	15

8548. $\Sigma 2315$. Spec. A0. P.M. $-0^s\cdot 0001$, $-0''\cdot 015$ (Greenwich, 1910). It is rather difficult to adjust the angles and distances, but the following positions are probably fairly correct:—

	1830	$281^\circ\cdot 4$	$0''\cdot 64$
	1850	$270^\circ\cdot 1$	$0''\cdot 56$
	1870	$254^\circ\cdot 0$	$0''\cdot 45$
	1890	$225^\circ\cdot 0$	$0''\cdot 34$
	1910	$186^\circ\cdot 0$	$0''\cdot 34$

These give the hypothetical parallax as follows:—

	p_1	p_2	p_3
1830-1870	$\cdot 011$	$\cdot 014$	$\cdot 013$
1870-1910	$\cdot 013$	$\cdot 006$	$\cdot 014$

8543. $\beta 1203$. Spec. A3. The position angle appears to have increased 10° in 20 years at $0''\cdot 31$. $p_1 = ''\cdot 005$.

8574. $\Sigma 2323$. 39 Draconis. Spec. A2. P.M. $-0^s\cdot 0043$, $+0''\cdot 055$ (Boss). The following positions show the motion:—

	1830	$366^\circ\cdot 5$	$3''\cdot 10$
	1910	$356^\circ\cdot 5$	$3''\cdot 70$

These positions give $p_1 = ''\cdot 023$, $p_3 = ''\cdot 028$.

8575. $O\Sigma 351$. Spec. G5. This was found by Hussey to be an extremely close triple system, and it is difficult to be certain about the motion. The position angle of the $O\Sigma$ pair may have decreased 17° in 60 years at $0''\cdot 53$. $p_1 = ''\cdot 006$.

8584. $\Sigma 2320$. Spec. B9. P.M. $-0^s\cdot 0005$, $+0''\cdot 018$ (Greenwich, 1910). The position angle has decreased $6^\circ\cdot 1$ in 80 years at $1''\cdot 66$. $p_1 = ''\cdot 008$.

8615. $\Sigma 2329$. Spec. B9. The position angle has increased $3^\circ\cdot 1$ in 80 years at $4''\cdot 16$. $p_1 = ''\cdot 013$.

8622. $O\Sigma 354$. Spec. F5. The position angle has increased 20° in 60 years at $0''\cdot 85$. $p_1 = ''\cdot 011$.

8660. $\Sigma 2345$. This is probably an optical pair. The change in position is shown by:—

	1830	$185^\circ\cdot 0$	$7''\cdot 34$
	1910	$205^\circ\cdot 6$	$8''\cdot 67$

8662. $O\Sigma 359$. Spec. K0. P.M. $+0^s\cdot 0015$, $-0''\cdot 001$ (Boss). The relative motion is indicated by:—

	1845	$359^\circ\cdot 1$	$0''\cdot 75$
	1878	$351^\circ\cdot 3$	$0''\cdot 57$
	1911	$332^\circ\cdot 2$	$0''\cdot 31$

This pair should be regularly observed with large reflectors at the present time. The above positions give $p_1 = ''\cdot 008$, $p_2 = ''\cdot 013$, $p_3 = ''\cdot 012$.

8659. $O\Sigma 357$. Spec. A2. The relative motion is indicated by:—

	1845	$274^\circ\cdot 3$	$0''\cdot 45$
	1868	$262^\circ\cdot 7$	$0''\cdot 43$
	1891	$249^\circ\cdot 2$	$0''\cdot 39$
	1914	$230^\circ\cdot 7$	$0''\cdot 31$

The period must be several centuries. These figures give the hypothetical parallax as follows:—

	p_1	p_2	p_3
1845-1891	$\cdot 008$	$\cdot 010$	$\cdot 008$
1868-1914	$\cdot 008$	$\cdot 011$	$\cdot 009$

8663. $O\Sigma 358$. Spec. G0. P.M. $+0^s\cdot 0026$, $-0''\cdot 094$ (Bossert). The relative motion is shown by:

	1845	$222^\circ\cdot 2$	$1''\cdot 17$
	1870	$205^\circ\cdot 4$	$1''\cdot 71$
	1895	$195^\circ\cdot 1$	$1''\cdot 90$
	1920	$186^\circ\cdot 1$	$1''\cdot 98$

These positions give:—

	p_1	p_2	p_3
1845-1895	$\cdot 030$	$\cdot 050$	$\cdot 035$
1870-1920	$\cdot 027$	$\cdot 039$	$\cdot 027$

8721. $\Sigma 2364$. Spec. K0. P.M. $-0^s\cdot 0007$, $+0''\cdot 004$ (Greenwich, 1910). The relative motion seems to indicate that this is an optical pair.

	1830	$182^\circ\cdot 6$	$6''\cdot 42$
	1910	$177^\circ\cdot 9$	$7''\cdot 95$

8736. $\Sigma 2367$. Spec. G5. P.M. $+0^s\cdot 0019$, $-0''\cdot 060$ (Greenwich, 1910). The interpretation of the discordant observations of this pair is rather difficult. From Burnham's and Aitken's observations it appears that between 1892 and 1905 the position angle decreased from 100° to 80° while the separation increased from $0''\cdot 1$ to $0''\cdot 3$. On consideration of the

early observations it appears that at Struve's time the position angle was perhaps about 70° and that it decreased slowly to 60° by 1884. It is unfortunate that there are no more observations between 1875 and 1891 than those of Schiaparelli and Engelmann in 1883. It is possible that this was an extremely close pair between the dates mentioned, and that the only part of the orbit where the separation exceeds $0''.2$ is from about 90° to 60° in position angle. If this hypothesis is correct the greater part of the apparent orbit has been described, although it will be impossible to assign even an approximate period till the companion is found closing in at position angle 60° . The pair should be carefully observed with large refractors in both angle and distance.

8759. $\Sigma 2384$. P.M.— $0^s.0227$, $+0''.195$ (Porter). This is another pair which is undoubtedly binary, but for which the observations are few and uncertain. The observations from 1832 to 1854 give constant rate of description of area as follows:—

1832	310.3	0.77
1843	317.5	0.60
1854	332.5	0.37

It appeared single to Dembowski in 1865 and to Burnham in 1878. The observations from 1890 to 1905 show the separation increasing from $0''.40$ to $0''.69$, but with the position angle almost constant about 308° . This, however, is inconsistent with the description of area between 1832 and 1854. We can therefore only assert that the separation decreased and is now increasing in practically the same position angle (or perhaps 180° different). There is no indication that the separation was near a maximum at the time of Struve's observations. Abs. Trig. Par., $-''002$ (1).

8751. $\Sigma 2369$. Spec. Go. P.M.— $0^s.0038$, $-0''.064$ (Bossert). The observations are represented by:—

1830	98.2	1.54
1872	95.5	1.27
1914	91.9	0.90

These positions give $p_1 = ''006$, $p_2 = ''018$, $p_3 = ''017$.

8776. $\Sigma 2375$. Spec. Ao. P.M.— $0^s.0004$, $-0''.014$ (Boss). The position angle has increased $5^\circ.8$ in 80 years at $2''.24$. $p_1 = ''010$.

8824. $\Sigma 2396$. Spec. K₄. P.M.— $0^s.0078$, $-0''.449$ (Porter). This is a well-known optical pair, the relative motion being due to the brighter component. Abs. Trig. Par., $''062$ (2). Spec. Par., $''058$.

8830. $\Sigma 2400$. In this well-known triple system the bright star is only an optical member, while the two faint stars appear to form a binary, as no relative motion has been observed since 1884. It is usually assumed that the early observations, 1829–1851, refer to the more distant of the two faint stars, and that the observations of O Σ in 1855 and later refer to a different object. A careful consideration of the observations leads to the view that this is erroneous, and that the more distant star now

called C was not observed till 1883. On this view there is no necessity to assume variability in any of the stars. The difficulty in observing any companion between 1850 and 1870 is explained by the considerable difference in magnitude and the comparative closeness of the bright star to the two faint ones. Also, the relative motion of A and B, obtained on the assumption that Struve observed the nearer star, agrees much better with the known proper motion of A. The two observations given in Burnham's *General Catalogue*, vol. i., refer to the same pair AB. The motion of A relative to BC is $''067$ annually in the direction $329^\circ.4$. Taking C as at $0''.90$ in 198° from B, we find:—

	A—B.		A—C.	
1910	173.5	2.93	179.5	3.78
1920	169.2	3.55	175.1	4.35
1930	165.8	4.19	171.9	4.97

8861. $\Sigma 2410$. Spec. F8. The position angle has apparently decreased $4^\circ.5$ in 80 years at $1''.44$. $p_1 = ''006$.

8905. $\Sigma 2415$. Spec. Ao. The position angle has decreased $5^\circ.9$ in 80 years at $2''.01$. $p_1 = ''009$.

8909. $\beta 137$. Spec. Go. The position angle has increased $10^\circ.7$ in 30 years at $1''.19$. $p_1 = ''016$.

8930. $\Sigma 2422$. Spec. Ao. P.M.— $0^s.0008$, $+0''.016$ (Greenwich, 1910). The position angle has decreased $13^\circ.6$ in 80 years at $0''.82$. $p_1 = ''007$.

8933. $\beta 648$. Spec. Go. P.M.— $0^s.0137$, $-0''.160$ (Boss). The following comparison of the Greenwich observations is with Aitken's orbit (*Publ. Lick. Obs.*, xii. 133):—

	Observed.	n.	Obs.—Comp.
1895.59	237.9	1.49	3 + 3.2 + 1.7
1896.59	231.5	1.28	5 - 1.1 - 0.3
1897.52	232.8	1.20	5 + 2.3 - 0.8
1898.63	228.9	1.33	3 + 0.9 + 0.8
1899.44	222.4	0.96	1 - 3.7 - 2.6
1900.66	225.7	1.14	3 + 3.2 - 0.1
1901.60	220.0	1.11	2 + 0.3 + 0.2
1902.63	217.3	1.00	1 + 1.2 - 0.1
1906.69	179.0	0.42	1 - 12.1 - 1.8
1907.73	182.2	0.51	2 + 4.4 + 0.1
1912.76	83.8	0.42	1 + 6.5 - 1.5
1913.71	64.2	0.60	3 - 4.0 - 0.4

The hypothetical parallax from Aitken's orbit is $''064$. Abs. Trig. Par., $''095$ (4). Spec. Par., $''083$.

8940. $\Sigma 2424$. Π Aquilæ. Spec. A. P.M.— $0^s.0001$, $-0''.120$ (Boss). The observed change is due to proper motion.

8966. $\Sigma 2438$. Spec. A₂. P.M.— $0^s.0034$, $+0''.046$ (Boss). An orbit for this binary has been computed by Sec. *M.N.R.A.S.*, lxviii. 568. It is also discussed by van Biesbroeck in *Ciel et Terre*, xxxv. 218. If the position angle of Herschel in 1782 and 1783 is accepted the period is about 240 years. The eccentricity in any case is very large.

8988. $\Sigma 2437$. Spec. G5. The position angle has decreased $23^{\circ}.0$ in 80 years at a mean separation of $0''.92$. The measures of distance indicate that the separation is decreasing, but the position angles which are not accordant do not support this. $p_1 = ".011$.

8986. $\Sigma 2434$. Spec. G5. P.M.— $0^s.0038$, $-0''.118$ (Boss). The wide pair is optical. The relative motion of the close pair is represented by :—

1830	80.9	1.93
1857	73.3	1.83
1884	63.7	1.53
1911	47.5	1.08

These positions give the hypothetical parallax as follows :—

	p_1	p_2	p_3
1830-1884	.023	.041	.026
1857-1911	.025	.035	.032

9023. $\Sigma 2451$. The relative motion is shown by :—

1830	58.4	2.61
1910	70.4	2.03

These positions give $p_1 = ".017$, $p_3 = ".023$.

9035. $\Sigma 2453$. The relative motion is probably due to the proper motion of the brighter component.

1830	99.8	15.06
1910	94.1	14.10

9038. $\Sigma 2454$. Spec. Ko. P.M.— $0^s.0049$, $-0''.030$ (Greenwich, 1910). The position angle has increased $49^{\circ}.7$ in 80 years at a mean separation of $0''.84$. $p_1 = ".016$.

9054. $\Sigma 2478$. Spec. Ko. The position angle has increased $8^{\circ}.8$ in 80 years at $1''.21$. $p_1 = ".007$.

9043. $\Sigma 2455$. Spec. Fo. The observations are usually considered as indicating that this is an optical pair. However, two stars of magnitude 7.2 and 8.3 are not to be expected so close to each other. Moreover, the relative motion of the two stars does not quite correspond to the proper motion of the brighter. It is quite possible that this is a binary system as indicated by :—

1830	142.3	4.50
1845	132.1	4.04
1860	119.9	3.70
1875	105.8	3.46
1893	87.3	3.43
1911	70.0	3.61

It will be seen that both the position angle and separation here given for 1830 are smaller than those given by Struve. If the motion is really due to difference of proper motions the separation would be nearer that given by Struve, but the position angle would be still more different from Struve's observation. Accurate measures of this double star at the present time will soon settle the question. A

parallax determination of this pair would also be useful. If this is a binary the period will be at least 1000 years. The hypothetical parallax deduced from the above positions is as follows :—

	p_1	p_2	p_3
1830-1860	.088	.053	.096
1845-1875	.090	.071	.095
1857-1893	.090	.053	.092
1875-1911	.090	.065	.092

9056. $\Sigma 2466$. Spec. Ao. P.M.— $0^s.0003$, $+0''.002$ (Greenwich, 1910). The position angle appears to have decreased $4^{\circ}.0$ in 80 years at $2''.39$. $p_1 = ".009$.

9063. Ho. 442. The Greenwich measures of distance do not agree with previous measures.

9114. Secchi 2. Spec. G5. P.M.— $0^s.0210$, $-0''.103$ (Porter). The comparison of the close pair BC is with Russell's orbit (*Publ. Lick. Obs.*, xii. 138) :—

	Observed.	n.	Obs.—Comp.
1914.10	104.0	0.35	6 +5.3 -17

In the elements given by Russell ω is given as 0° and not 180° , as was used in computing the ephemeris. This corresponds to interchanging the components.

The wide pair A, BC constitutes $\Sigma 2481$. Burnham appears to consider this as an optical combination, as he ascribes the observed motion to difference of proper motions. There can be little doubt that it is a real binary. The separation has been slowly increasing since Struve's time, and probably was much smaller at the time of Herschel's observation in 1783. The following positions indicate the motion :—

1830	235.6	3.83
1860	228.8	4.01
1890	222.5	4.11
1911	218.2	4.15
1920	(216.4)	(4.15)

	p_1	p_2	p_3
1830-1890	.038	.052	.040
1860-1920	.038	.050	.038

The hypothetical parallax of the system BC from Russell's element is $".021$. Abs. Trig. Par., $".023$ (2). Spec. Par., $".026$ for BC (Spec. Ko) and $".029$ for A (Spec. G5).

9124. $\Sigma 2482$. Spec. Fo. The position angle has decreased $6^{\circ}.8$ in 80 years at $2''.03$. $p_1 = ".010$.

9155. $\Sigma 2488$. Spec. G5. P.M.— $0^s.006$, $-0''.06$ (Porter). The position angle has increased $11^{\circ}.9$ in 80 years at $1''.52$. $p_1 = ".011$.

9172. Ho. 447. The Greenwich measures of distance do not agree with previous measures.

9173. $\Sigma 2491$. Spec. A2. P.M.— $0^s.0006$, $+0''.034$ (Greenwich, 1910). The position angle has increased $12^{\circ}.4$ in 80 years at $1''.13$. $p_1 = ".009$.

9279. $\Sigma 2513$. Spec. F8. The position angle appears to have increased $4^{\circ}.9$ in 80 years at $2''.22$. $p_1 = ".009$.

9298. $\Sigma 2518$. Spec. F5. The position angle has apparently decreased $4^{\circ}.9$ in 80 years at $5''.09$. $p_1 = ".021$.

9319. $\Sigma 2525$. Spec. F8. P.M. $+0^s.0069$, $+0''.087$ (Greenwich, 1910). A new orbit has been computed with hypothetical parallax of $".018$. Abs. Trig. Par., $".019$ (1).

9318. $\Sigma 2524$. Spec. A. P.M. $+0^s.0037$, $+0''.004$ (Greenwich, 1910). The position angle has decreased $7^{\circ}.5$ in 80 years at a mean separation of $6''.73$. $p_1 = ".037$.

9325. Ho. 451. The position angle appears to be decreasing, but the measures of distance are discordant.

9381. $\Sigma 2536$. P.M. $-0^s.0013$, $-0''.126$ (Porter). The observed changes of angle and distance do not agree with constant rate of description of area, as the angular motion seems to be falling off and the distance has, if anything, decreased. The following position angles must be affected by systematic errors:—

1830	37.0
1870	59.6
1910	78.0

Using a mean separation of $1''.87$, $p_1 = ".032$.

9391. $\beta 438$. The notation used for the stars is that of Burnham's *General Catalogue*, Part II.

9415. $O\Sigma 375$. Spec. G5. The position angle has increased 10° in the 45 years to 1915 at a mean separation of $0''.62$. The earlier measures show a more rapid change in angle, but there is little evidence that the separation was much less. $p_1 = ".006$.

9456. $\Sigma 2553$. Spec. G0. The position angle has increased uniformly $21^{\circ}.9$ in 80 years at $0''.98$. $p_1 = ".011$.

9450. $\Sigma 2544$. Spec. A3. The position angle has decreased $15^{\circ}.0$ in 80 years at $1''.08$. $p_1 = ".009$.

9459. $O\Sigma 377$. Spec. A. The observations are discordant but indicate a decrease in the position angle of about 11° in 65 years at $0''.88$. $p_1 = ".007$.

9500. $\Sigma 2556$. Spec. F2. The following positions indicate the motion:—

1830	192.0	0.66
1860	176.6	0.61
1890	156.3	0.49
1911	135.6	0.39

	p_1	p_2	p_3
1830-1890	".011	".015	".012
1860-1911	".012	".013	".013

9570. $\Sigma 2574$. Spec. F5. The angular motion is rapidly increasing, and the pair is now close:—

1830	130.2	0.94
1851	134.4	0.805
1872	140.4	0.66
1893	150.0	0.51
1914	166.6	0.37

These positions give:—

	p_1	p_2	p_3
1830-1872	".008	".021	".014
1851-1893	".009	".010	".014
1872-1914	".010	".008	".013

9565. $O\Sigma 383$. Spec. A0. The change is very small, only about 3° in 60 years at $0''.84$. $p_1 = ".003$.

9605. $\Sigma 2579$. δ Cygni. Spec. A. P.M. $+0^s.0050$, $+0''.037$ (Boss). A new orbit has been computed with a hypothetical parallax of $".036$. Abs. Trig. Par., $".054$ (1).

9602. $\Sigma 2576$. Spec. K0. P.M. $+0^s.0012$, $-0''.433$ (Porter). The orbital motion is shown by:—

1830	319.6	3.60
1851	313.3	3.46
1872	306.3	3.24
1893	297.8	2.84
1914	284.3	2.05

The angular motion is now about 1° a year and should continue to increase. The period will be several centuries. The above positions give the following results:—

	p_1	p_2	p_3
1830-1872	".043	".059	".046
1851-1893	".044	".070	".050
1872-1914	".049	".082	".062

Abs. Trig. Par., $".041$ (1). Spec. Par., $".032$.

9634. $\Sigma 2583$. π Aquilæ. Spec. F2, A2. P.M. $+0^s.0006$, $-0''.007$ (Boss). The position angle has decreased $7^{\circ}.2$ in 80 years at $1''.42$. $p_1 = ".007$.

9643. A. G. Clark 11. ζ Sagittæ. Spec. A2. P.M. $+0^s.0013$, $+0''.025$ (Boss). The following comparison is with van Biesbroeck's orbit (*A.J.*, No. 692):—

	Observed.	n.	Obs.—Comp.
1896.36	169.1	0.22	3 — 0.6 — .11
1899.13	163.2	0.34	8 — 2.0 + .03
1901.40	155.0	0.19	7 — 6.0 — .09
1904.74	150.8	0.18	4 — 0.9 — .03
1907.70	140.4	0.19	3 + 7.0 + .06
1908.74	113.8	0.18	4 — 8.0 + .07
1913.69	351.7	0.21	4 (—20) (+.14)
1915.65	163.4	0.18	1 — 17.3 — .02

Hyp. Par., $".030$.

9650. $O\Sigma 387$. Spec. F5. P.M. $+0^s.0068$, $+0''.084$ (Porter). A new orbit has been computed with a hypothetical parallax of $".018$. Abs. Trig. Par., $".021$ (1). Spec. Par., $".017$.

9686. $\beta 979$. The position angle appears to have decreased about 8° in 30 years at $2''.16$. $p_1 = ''024$.

9712. $\Sigma 2596$. Spec. F8. The position angle has decreased $28^\circ.8$ in 80 years at a mean separation of $2''.07$. It is possible that the separation has slightly decreased and the motion in angle increased. $p_1 = ''028$.

9719. $\Sigma 2597$. Spec. F2. The motion is shown by:—

1827	$92^\circ.1$	$1''.92$
1907	$87^\circ.8$	$1''.15$

These positions give $p_3 = ''021$.

9724. $O\Sigma 532$. β Aquilæ. Spec. Ko. P.M. $+0^\circ.0023$, $-0''.483$ (Boss). There appears to be a rather uncertain increase in the position angle of $5^\circ.6$ in 50 years at a separation of $12''.17$. This motion gives $p_1 = ''075$. Abs. Trig. Par., $''076$ (3). Spec. Par., $''100$.

9739. Ho. 581. Comparison with Van Biesbroeck's orbit, A.J. 741:—

	Observed.	n.	Obs.—Comp.
1911.78	$122^\circ.1$	$0''.28$	$1 + 0^\circ.6 + 1''.17$

9782. $O\Sigma 392$. Spec. A2. P.M. $-0^\circ.0001$, $-0''.015$ (Boss). The position angle has decreased, but the amount is rather uncertain—about 21° in 60 years at $0''.37$. $p_1 = ''005$.

9783. $\Sigma 2606$. Spec. A5. The position angle has increased $5^\circ.5$ in 80 years at $1''.20$. $p_1 = ''005$.

9833. $O\Sigma 395$. 16 Vulpeculæ. Spec. Fo. P.M. $+0^\circ.0059$, $+0''.059$ (Boss). The position angle is increasing slowly and the separation increasing, as shown in the following positions, of which the first is rather uncertain:—

1842	$71^\circ.0$	$0''.45$
1866	$87^\circ.3$	$0''.565$
1890	$97^\circ.9$	$0''.69$
1914	$105^\circ.4$	$0''.79$
	p_1	p_3
1842-1890	$''010$	$''012$
1866-1914	$''010$	$''012$

9834. $\Sigma 2615$. The change is probably due to difference in the proper motions.

9921. $\Sigma 2627$. Spec. A5. The position angle appears to have increased 5° in 80 years at $1''.96$. $p_1 = ''008$.

9926. $\Sigma 2628$. Spec. F5. The position angle has decreased $4^\circ.1$ in 80 years at a mean separation of $4''.33$. The separation may be slowly decreasing. $p_1 = ''016$.

9944. $\Sigma 2642$. Spec. Go. P.M. $+0^\circ.0308$, $+0''.150$ (Porter). The position angle has increased $9^\circ.4$ in 80 years at $2''.24$. $p_1 = ''014$.

9979. $O\Sigma 400$. Spec. G5. Comparison with Burnham's orbit (*M.N.R.A.S.*, vol. lviii. 87):—

	Observed.	n.	Obs.—Comp.
1913.9	$345^\circ.4$	$0''.35$	$1 - 3^\circ.5 - 22$

The hypothetical parallax of Burnham's orbit is $''020$. Abs. Trig. Par., $''049$ (1). Spec. Par., $''030$.

9994. $\Sigma 2652$. Spec. Ao. The position angle has decreased $26^\circ.7$ in 80 years at a separation of $0''.33$. $p_1 = ''004$.

10,017. $\Sigma 2653$. Spec. Ao. The position angle has increased $10^\circ.1$ in 80 years at $2''.47$. $p_1 = ''016$.

10,072. $\beta 984$. Spec. F8. P.M. $-0^\circ.0019$, $-0''.071$ (Greenwich, 1910). The position angle has increased $11^\circ.7$ in 35 years at a mean separation of $0''.76$. $p_1 = ''010$.

10,147. $\Sigma 2672$. Spec. F8. The position angle has increased $22^\circ.1$ in 80 years at $0''.93$. $p_1 = ''011$.

10,160. $\Sigma 2673$. Spec. F2. The position angle has decreased $5^\circ.8$ in 80 years at $2''.60$. $p_1 = ''012$.

10,213. $\Delta 22$. Spec. G5. The position angle appears to have increased 5° in 35 years at $2''.76$. $p_1 = ''020$.

10,220. Ho. 130. The measures appear to show a rapid increase in the separation.

10,275. $\Sigma 2688$. The separation has increased from $5''.56$ in 1830 to $6''.64$ in 1905.

10,281. Dawes 1. Spec. Ao. P.M. $-0^\circ.0015$, $-0''.006$ for the close pair; $0^\circ.0000$, $+0''.004$ for the brighter and following star of $\Sigma 2690$ (Boss). The position angle of the close pair has increased $8^\circ.7$ in 60 years at $0''.50$. $p_1 = ''004$.

10,310. $\beta 670$. The position angle has decreased $21^\circ.4$ in 40 years at $0''.56$. $p_1 = ''010$.

10,314. $\Sigma 2696$. The separation may be decreasing.

10,363. $\beta 151$. β Delphini. Spec. F5. P.M. $+0^s.0074$, $-0^s.037$ (Boss). The following comparison of the observations is with Aitken's orbit (*Publ. Lick. Obs.*, xii. 150):—

	Observed.	n.	Obs.—Comp.
1895.73	350.8	0.66	3 — 1.2 +.03
1899.58	5.9	0.49	10 + 1.1 —.12
1900.64	9.4	0.64	2 + 0.3 +.07
1901.66	15.8	0.46	13 + 2.0 —.06
1902.73	19.9	0.38	6 + 0.3 —.07
1903.82	31.2	0.33	5 + 3.6 —.04
1904.75	39.6	0.25	6 — 0.6 —.05
1905.76	51.3	0.25	2 — 9.9 +.03
1906.79	100.3	0.15	2 + 3.2 —.04
1907.73	125.5	0.25	4 — 6.6 +.04
1908.74	138.6	0.21	4 — 21.3 —.05
1909.74	176.8	0.20	3 + 3.8 —.11
1910.64	189.0	0.25	1 + 3.3 —.06
1911.74	202.5	0.21	3 — 0.3 —.06
1912.73	237.3	0.21	7 + 13.1 —.02
1913.70	252.5	0.17	7 — 0.9 —.03
1914.70	280.9	0.24	5 — 3.3 +.02
1915.74	306.2	0.16	2 — 0.6 —.12

The faint stars C and D are only optical members of the system.

The hypothetical parallax of the close pair from the orbit elements is $^s.043$. Abs. Trig. Par., $^s.027$ (4). Spec. Par., $^s.046$.

10,402. $\Sigma 2708$. P.M. $+0^s.0144$, $-0^s.195$ (Porter). This is an optical pair, and does not require observation at present.

10,404. $\Sigma 2709$. The position angle has decreased $7^{\circ}.8$ in 80 years at $9^{\circ}.22$. This is probably an optical pair.

10,423. $O\Sigma 410$. Spec. B8. P.M. $+0^s.0010$, $-0^s.014$ (Boss). The position angle has decreased $13^{\circ}.3$ in 70 years at $0^{\circ}.64$. $p_1 = ^s.006$.

10,461. $\Sigma 2720$. Spec. F8. The position angle may have decreased about 4° in 75 years at $3^{\circ}.89$. $p_1 = ^s.015$.

10,483. $\Sigma 2723$. Spec. A0. The position angle has increased $19^{\circ}.7$ in 80 years at $1^{\circ}.32$. $p_1 = ^s.014$.

10,487. $\beta 64$. Spec. G. The angle has increased $22^{\circ}.9$ in 40 years at a mean separation of $0^s.57$. Recent measures indicate that the separation is decreasing. $p_1 = ^s.010$.

10,506. $\Sigma 2726$. $\zeta 2$ Cygni. Spec. G8. P.M. $-0^s.0011$, $+0^s.023$ (Boss). The position angle has increased $6^{\circ}.2$ in 75 years at a mean separation of $6^s.4$. $p_1 = ^s.032$. Abs. Trig. Par., $^s.014$ (1). Spec. Par., $^s.024$.

10,504. $\Sigma 2725$. Spec. K0. P.M. $+0^s.0068$, $+0^s.083$ for A and $+0^s.0064$, $+0^s.054$ for B (Bossert). The relative motion is shown by:—

1783	348.7	(3.6)
1830	356.2	4.30
1910	3.8	5.30

This is probably a real binary. The positions for 1830 and 1910 give $p_1 = ^s.027$, $p_3 = ^s.041$. Abs. Trig. Par., $^s.016$ (1). Spec. Par., $^s.040$ for the brighter and $^s.026$ for the fainter star.

10,519. $\beta 364$. Spec. G5. P.M. $-0^s.0027$, $-0^s.049$ (Greenwich, 1910). The position angle has increased $8^{\circ}.0$ in 40 years at $1^{\circ}.21$. $p_1 = ^s.011$.

10,533. $O\Sigma 413$. λ Cygni. Spec. B5. P.M. $+0^s.0003$, $-0^s.011$ (Boss). It is suggested by Hussey (*Publ. Lick. Obs.*, v. 169) that the relative motion is due to difference in the proper motion of the components. This suggestion is denied neither by Burnham nor by Aitken (*Publ. Lick. Obs.*, xii. 152). It is highly improbable that two stars of magnitude 5.0, 6.3 should be at a separation of about two-thirds of a second for 60 years unless physically connected. The angular motion distinctly indicates that this is a binary, as do also the observed separations at the two ends of the arc, which are less than those computed by Hussey on the basis of rectilinear motion. The fact is that single observations over an arc of 60° or so are insufficient to distinguish between the arc of a circle and the side of a hexagon of equal area. When the angles and distances are plotted against the time and mean positions adopted the arc obtained shows large curvature. In the following positions the separation has been adjusted to satisfy the law of areas, while the position angles are in close agreement with the observations:—

1840	119.2	0.54
1864	94.5	0.63
1888	74.1	0.66
1912	55.3	0.68

The period should be of the order of 400 years. The above positions give:—

	p_1	p_2	p_3
1840–1888	$^s.016$	$^s.019$	$^s.016$
1864–1912	$^s.015$	$^s.016$	$^s.015$

10,559. $\Sigma 2729$. γ Aquarii. Spec. F. P.M. $+0^s.0060$, $-0^s.011$ (Boss). A new orbit with a hypothetical parallax of $^s.019$ has been computed.

10,587. Ho. 145. The observations indicate the following motion:—

1887	319.2	7.82
1907	310.2	8.53

The pair is probably optical.

10,595. $\Sigma 2734$. This is an optical pair.

10,608. $O\Sigma 418$. Spec. G0. The separation appears to have increased from $0^s.50$ in 1842 to about $1^s.15$ in 1910. It may now be near maximum. There has been no appreciable change in position angle. Taking the mean separation as $1^s.00$, $p_3 = ^s.018$.

10,607. $\beta 367$. Spec. G5. P.M. $+0^s.0087$, $-0^m.079$ (Greenwich, 1910). The period of this binary should prove comparatively short—probably of the order of 150 years. The observations are represented by:—

1878.0	117.4	0.53
1890.0	128.0	0.49
1902.0	142.0	0.385
1909.3	157.4	0.27
1914.0	181.3	0.18
1916.6	214.4	0.15

	p_1	p_2	p_3
1878-1902	.013	.021	.015
1890-1914	.017	.023	.019
1902-1916.6	.021	.021	.021

10,621. Ho. 460. Spec. Ko. P.M. $-0^s.0001$, $+0^m.024$ (Greenwich 1910). There is a large difference in the angles for so wide a pair.

10,643. $\Sigma 2737$. ϵ Equulei. Spec. F5. P.M. $-0^s.0084$, $-0^m.144$ (Boss). The change has been mostly in distance, as is shown by:—

1836	294.0	0.37
1845	..	0.71
1860	287.5	1.00
1875	..	1.08
1890	..	0.93
1905	284.5	0.58
1914	..	0.25

These positions give the values of p_3 for the intervals 1836-1860, 1875-1905, 1890-1914 as ".032, ".025, ".032. This pair should now be very close and should be carefully observed. When the elongation in the second quadrant has been passed it should be possible to estimate the period. The period is certainly over 80 years, but it may be under 100 years. Russell has given, A.J. 719, an orbit with a period of 97.4 years. Hyp. Par., ".023.

For the system AB, C, the position angle has decreased $5^{\circ}.0$ in 80 years at $10^m.7$. $p_1 = ".045$. Abs. Trig. Par., ".019 (2). Spec. Par., ".019 for AB, ".015 for C.

10,690. $\Sigma 2746$. Spec. Fo. The position angle has increased $20^{\circ}.6$ in 75 years at $0^m.97$. $p_1 = ".011$.

10,685. $\Sigma 2744$. Spec. F5. P.M. $-0^s.0092$, $-0^m.038$ (Porter). The position angle has decreased $28^{\circ}.3$ in 75 years at $1^m.53$. $p_1 = ".021$.

10709. Secchi 3. Spec. Go. The observations of the close pair discovered by Secchi are represented by:—

1860	138.6	0.60
1870	145.2	0.95
1880	148.8	1.10
1890	151.8	1.13
1900	155.0	1.03
1910	159.7	0.77

These positions give:—

	p_1	p_2	p_3
1860-1880	.016	.049	.034
1870-1890	.014	.045	.020
1880-1900	.014	.047	.015
1890-1910	.014	.047	.028

When the observed positions are plotted it is seen that the period will be relatively short—say, 100 to 150 years. The inclination will be large, with the line of nodes about 150° . The pair should be observed at the present time with large refractors, as it must now be a close pair showing rapid motion.

The stars A, BC form $\Sigma 2749$. At the time of maximum separation of BC it would be more satisfactory to observe AB and AC. The position angle of the Struve pair has increased 10° in 80 years at a mean separation of $3^m.45$. The exact interpretation of this may be difficult. $p_1 = ".023$.

10725. $\Sigma 2754$. This is probably an optical pair.

10,741. $\Sigma 2759$. This is evidently an optical pair.

10,746. $\Sigma 2760$. Another optical pair which will become a very close double.

10,749. $O\Sigma 527$. Spec. A2. The following table probably shows the motion in angle with fair accuracy, but the observations are very uncertain, and Dembowski's angles differ by as much as 35° from those given:—

1845	313.0
1860	298.6
1875	287.5
1890	278.3
1905	270.5

The mean of the observed distances is $0^m.41$. The decrease in the angular motion indicates that the separation has increased from $0^m.34$ to $0^m.48$. For uniform angular motion the period would be 500 years. $p_1 = ".009$.

10,773. $\Sigma 2762$. Spec. A0. P.M. $+0^s.0017$, $-0^m.016$ (Boss). The position angle has decreased $4^{\circ}.7$ in 75 years at $3^m.50$. $p_1 = ".015$.

10,809. $O\Sigma 430$. Spec. F8. P.M. $+0^s.0328$, $+0^m.096$ (Porter). The measures are few and rather discordant. They indicate a decrease in the position angle of about $14^{\circ}.7$ in 65 years at $1^m.40$. $p_1 = ".014$.

10,829. $O\Sigma 535$. δ Equulei. Spec. F5. P.M. $+0^s.0028$, $-0^m.303$ (Boss). The following comparison is with Aitken's orbit (*Publ. Lick. Obs.*, xii. 158):—

	Observed.	n.	Computed.
	round "		"
1895.71		2	0.16
1899.73	194.0	4	17.1 0.30
1900.61	206.0	1	352 0.07
1900.87	245.±	1	247 0.05
1901.58	190.6	6	197.9 0.16
1901.70	161.2	1	194.6 0.15
1901.73	67.2	5	193.7 0.14
1901.80	205.3	3	191.5 0.13
1901.84	51.6	4	189.9 0.13
1901.87	196.5	1	188.9 0.13
1902.76	26.6	6	38.9 0.12
1903.81	25.2	18	25.4 0.33

	Observed.	n.	Computed.
1904.78	17.4	0.26	13 20.6 0.37
1905.79	7.6	0.23	12 13.1 0.22
1906.62	309±	..	2 232.5 0.06
1906.79	221.9	0.18	7 213.1 0.10
1907.78	150.8	0.14	7 172.4 0.10
1907.78	85.8	0.14	6 172.4 0.10
1907.94	140±	..	1 132 0.07
1908.78	34.8	0.24	16 32.6 0.21
1909.61	19.0	..	1 24.9 0.34
1909.68	27.0	elong.	1 24.4 0.35
1909.78	21.1	0.24	7 23.8 0.35
1910.75	16.4	0.23	5 18.9 0.34
1911.69	3.3	0.18	5 6.9 0.17
1912.79	251.7	0.14	3 202.7 0.16
1913.48	194.6	0.17	1 172.4 0.10
1913.65	200.1	0.14	1 126 0.07
1913.78	63.7	0.19	3 79 0.05
1914.70	27.6	0.26	4 29.7 0.26
1915.74	21.5	0.30	2 22.5 0.37

Position angles have been collected to a mean only when they agreed fairly well together.

The hypothetical parallax is $''\cdot067$. Abs. Trig. Par., $''\cdot053$ (3). Spec. Par., $''\cdot060$.

C is an optical member of the system.

10,833. Hu. 767. This pair should be carefully observed with large refractors, as it is probably in rapid motion.

10,841. OΣ432. Spec. G5. P.M. $+0^s\cdot0028$, $+0^s\cdot029$ (Boss). The position angle has decreased $5^\circ\cdot7$ in 65 years at $1''\cdot21$. $p_1 = ''\cdot006$.

10,846. A. G. Clark 13. τ Cygni. Spec. F0. P.M. $+0^s\cdot0133$, $+0^s\cdot427$ (Boss). Comparison with Aitken's orbit (*Publ. Lick. Obs.*, xii. 161) :—

	Observed.	n.	Obs.—Comp.
1896.56	336.9	0.48	1 +8.7 -34
1899.34	309.2	0.59	2 -1.3 -27

The hypothetical parallax is $''\cdot055$. Abs. Trig. Par., $''\cdot042$ (5). Spec. Par., $''\cdot042$.

10,871. β 162. Spec. A2. The position angle has increased about $5^\circ\cdot8$ in 40 years at $1''\cdot15$. $p_1 = ''\cdot008$.

10,883. Σ2785. There appears to be no change in the position angle, but the separation has increased from $2''\cdot48$ in 1830 to $3''\cdot05$ in 1910. $p_3 = ''\cdot021$.

10,880. β 163. P.M. $0^s\cdot0000$, $-0^s\cdot071$ (Bossert). There has been no change in the position angle, while the separation has decreased from $1''\cdot15$ in 1876 to $0''\cdot60$ in 1899. In 1905, 1911, and 1912 no companion was seen by Aitken. The plane of the orbit must pass nearly through the line of sight.

10,908. Ho. 286. This is a bright close pair and probably has a short period.

10,910. β 838. Spec. F8. The position angle has increased $16^\circ\cdot9$ in 30 years at $1''\cdot50$. $p_1 = ''\cdot027$.

10,922. OΣ437. Spec. G5. The motion so far observed is indicated by :—

1845	64.7	1.27
1860	57.8	1.35
1875	51.8	1.45
1890	46.6	1.57
1905	42.1	1.70

These positions give for the whole interval $p_1 = ''\cdot020$, $p_3 = ''\cdot023$.

11,001. Σ2799. Spec. F2. The position angle has decreased uniformly through $39^\circ\cdot5$ in 80 years at a mean separation of $1''\cdot42$. $p_1 = ''\cdot023$.

11,042. Σ2802. Spec. A5. The position angle has decreased $4^\circ\cdot0$ in 80 years at $3''\cdot82$. $p_1 = ''\cdot014$.

11,051. Σ2804. Spec. F5. The position angle has increased $19^\circ\cdot5$ in 80 years at a mean separation of $2''\cdot91$. $p_1 = ''\cdot030$.

11,125. β 1212. 24 Aquarii. Spec. F5. P.M. $+0^s\cdot0157$, $+0^s\cdot015$ (Boss). The position angle has increased $36^\circ\cdot7$ in 23 years at $0''\cdot55$. $p_1 = ''\cdot020$. Abs. Trig. Par., $''\cdot017$ (2). Spec. Par., $''\cdot021$.

C is an optical member of the system.

11,168. OΣ448. Spec. G. P.M. $+0^s\cdot0057$, $-0^s\cdot017$ (Greenwich, 1910). The position angle has decreased $16^\circ\cdot7$ in 60 years at $0''\cdot72$. $p_1 = ''\cdot008$.

11,210. Ho. 166. Spec. F5. P.M. $+0^s\cdot0077$, $+0^s\cdot003$ (Greenwich, 1910). The relative motion is shown by the following positions in which the distances have been supplied to give constant rate of description of area. The period may be of the order of 150 years.

1887	123.7	0.41
1902	90.9	0.37
1917	50.5	0.33

These positions give $p_1 = ''\cdot018$, $p_3 = ''\cdot018$.

11,214. Σ2822. μ Cygni. Spec. F5. P.M. $+0^s\cdot0214$, $-0^s\cdot240$ for A, $+0^s\cdot0172$, $-0^s\cdot226$ for B (Boss). This binary is now showing rapid motion as the separation decreases. Although little curvature is shown, the change in velocity shows that this is a real binary. The observations are represented by the following positions :—

1830	113.7	5.61
1840	114.5	5.27
1850	115.3	4.90
1860	116.3	4.51
1870	117.5	4.09
1880	119.0	3.64
1890	120.9	3.18
1895	122.1	2.92
1900	123.5	2.64
1905	125.3	2.34
1910	127.7	2.02
1915	131.0	1.68

From these positions we derive the following results :

	p_1	p_2	p_3
1830-1870	(.027)	.073	.077
1870-1910	(.034)	.075	.083

Abs. Trig. Par., ".046 (1). Spec. Par., ".058. The spec. parallax of the star D (Spec. A9) is ".009, indicating that it is only an optical member of the system.

11,218. Ho. 605. The Greenwich observations differ from those of Hough and Doolittle in both angle and distance.

11,222. β 989. κ Pegasi. Spec. F5. P.M. $+0^s.0024$, $+0^m.002$ (Boss). Lewis's value of T, P, e, combined with Burnham's of a, δ , i, ω are:—

T 1897.8	a 0.29	i 77.5
P 11.35	e 0.49	Ω 109.2
n - 31.7		ω 253.9

where ω is measured in the direction with projects into increasing position angles, i.e. it is to be added to a value of the true anomaly, decreasing with advancing time.

Aitken (*Publ. Lick. Obs.*, xii. 166) finds that these elements make a good fit with his observations. The following ephemeris based on these elements is computed for regular intervals of the true anomaly. The time is counted from periastron:—

v	t	θ	e
°	yrs.	°	"
0	.000	326.1	.051
10	.095	313.0	.071
20	.191	305.7	.093
30	.291	301.0	.114
40	.397	297.5	.134
50	.512	294.7	.154
60	.640	292.3	.172
70	.784	290.0	.188
80	.948	287.9	.202
90	1.141	285.6	.212
100	1.369	283.2	.218
110	1.643	280.2	.217
120	1.977	276.5	.207
130	2.381	271.4	.189
140	2.870	263.2	.159
145	3.151	256.9	.141
150	3.453	248.0	.122
155	3.780	235.1	.105
160	4.128	216.7	.092
165	4.496	194.1	.091
170	4.880	172.9	.102
175	5.275	157.0	.123
180	5.675	146.1	.150
185	6.075	138.5	.178
190	6.470	133.0	.205
195	6.854	128.9	.230
200	7.222	125.7	.251
205	7.570	123.1	.269
210	7.897	121.0	.282
215	8.199	119.1	.291
220	8.480	117.5	.296
230	8.969	114.7	.295
240	9.373	112.3	.284
250	9.707	110.0	.264
260	9.981	107.9	.240

v	t	θ	e
°	yrs.	°	"
270	10.209	105.6	.212
280	10.402	103.2	.183
290	10.566	100.2	.154
300	10.710	96.5	.126
310	10.838	91.4	.098
320	10.953	83.2	.072
330	11.059	68.0	.049
340	11.159	36.7	.034
350	11.255	352.9	.036

With the above ephemeris we get the following comparison of the Greenwich observations:—

	Observed.	n.	Obs.—Comp.
1894.85	114.8	0.13	4 - 3.2 - .16
1894.89	112.2	..	1 - 5.5 ..
1895.73	103.0	..	1 - 9.8 ..
1895.75	104.8	0.12	6 - 7.9 - .17
1895.78	104.3	0.17	2 - 8.3 - .11
1896.65	81.3	0.10	6 - 24.4 - .11
1897.57	27.0	0.09	4 - 22 + .05
1897.77	16.6	..	1 + 44 ..
1897.80	4.8	..	1 + 38.7 ..
1897.90	342.0	..	1 + 29.5 ..
1898.69	299.3	0.27	5 + 10.7 + .07
1898.88	288.2	0.31	6 + 2.0 + .10
1899.75	274.4	0.18	11 - 2.4 - .03
1900.02	265.7	0.14	1 - 7.9 - .05
1900.68	254.3	0.14	9 - 8.6 - .02
1901.02	238.4	0.13	4 - 16.8 - .01
1901.62	198.1	0.11	13 - 35.2 + .01
1902.77	151.2	0.16	13 - 17.4 + .06
1903.78	132.9	0.18	8 - 7.1 + .01
1904.82	123.4	0.22	7 - 4.1 - .02
1905.80	113.0	0.25	15 - 7.3 - .03
1906.77	106.6	0.25	14 - 8.1 - .05
1907.78	96.1	0.15	15 - 11.8 - .09
1908.65	70.1	..	1 - 20.5 ..
1908.76	72.8	0.13	5 - 9 + .06
1908.77	59.8	<0.1	2 - 21 ..
1908.84	55.8	0.15	1 - 16 + .10
1909.60	321.7	0.17	2 + 25.7 + .03
1909.61	354 ±	0.1	1
1909.73	330 ±	..	1 + 37 ..
1909.81	298.3	0.15	2 + 6.2 - .03
1909.85	314.7	..	1 + 23.4 ..
1910.71	280.4	0.15	3 - 0.8 - .07
1911.69	279.3	0.23	5 + 10.6 + .05
1912.71	246.6	0.20	5 + 2.4 + .08
1913.75	206.4	0.18	8 + 19.0 + .09
1914.73	158.1	0.22	3 + 9.9 + .08
1915.74	131.5	0.15	2 0.0 - .06

See also *Lick. Obs. Bull.*, 304, where Dr Henroteau discusses spectroscopic observations. The hypothetical parallax is ".046. Abs. Trig. Par., ".038 (5). Spec. Par., ".030.

The star C is an optical member of the system, the relative motion being due to the proper motion of the bright pair.

11,246. Σ 2825. Spec. F2. P.M.— $0^s.0071$, $-0^m.057$ (Bossert). The position angle has increased $17^\circ.6$ in 80 years at $1^m.02$. $p_1 = ".010$.

11,346. β 75. Spec. G5. P.M.— $0^s.0077$, $-0^m.114$ (Porter). The early observations are not

in good agreement, but the following positions may be taken as representing the motion :—

1880	33°0	1"27
1896	39°5	1"10
1912	48°7	0"90

These give $p_1 = ".018$, $p_3 = ".025$.

11,490. $\Sigma 2862$. Spec. Go. The position angle may have decreased $3^\circ.4$ in 80 years at a separation of $2".36$. $p_1 = ".008$.

11,556. $O\Sigma 464$. Spec. A2. The position angle has increased $21^\circ.6$ in 65 years at $0".61$. $p_1 = ".008$.

11,592. $\Sigma 2877$. P.M.— 08.0069 , $-0".088$ (Boss). This is merely an optical pair.

11,590. $\Sigma 2878$. Spec. A0. The position angle has decreased $8^\circ.7$ in 80 years at $1".34$. $p_1 = ".008$.

11,599. $\Sigma 2881$. Spec. F5. P.M.— 08.0038 , $-0".048$ (Greenwich, 1910). The position angle has decreased $13^\circ.0$ in 80 years at $1".61$. $p_1 = ".013$.

11,650. $\beta 1216$. Spec. F5. P.M.— 08.0069 , $+0".024$ (Greenwich, 1910). The position angle has decreased $13^\circ.1$ in 20 years at $0".56$. $p_1 = ".011$.

11,657. $\Sigma 2895$. Spec. Ko. P.M.— 08.0007 , $-0".009$ (Greenwich, 1910). An analysis of the observations shows that they can be explained by difference in proper motions, B having a motion relative to A of $".061$ annually in the direction $62^\circ.6$. Later observations indicate the position for 1830 as $7^\circ.3$, $4".53$, against $6^\circ.1$, $4".85$ observed by Struve. The motion in future is represented by :—

1920	37°9	8"90
1935	40°2	9"75

11,687. Ho. 182. The position angle appears to have decreased $5^\circ.7$ in 20 years at $1".52$. $p_1 = ".017$.

11,690. $\Sigma 2900$. 33 Pegasi. Spec. F5. P.M.— 08.0239 , $-0".019$ (Boss). The position angle has remained nearly constant, while the separation has decreased as shown by 1830, $2".66$; 1871, $2".15$; 1912, $1".27$. This pair should be carefully observed at the present time. $p_3 = ".034$. Abs. Trig. Par., $".060$ (1). Spec. Par., $".040$.

11,691. $\beta 172$. 51 Aquarii. Spec. A0. P.M.— 08.0017 , $0".000$ (Boss). The position angle has decreased $31^\circ.6$ in 40 years at $0".63$. $p_1 = ".014$.

11,712. Ho. 616. This is probably an optical pair.

11,715. Sh. 345. 53 Aquarii. Spec. Go. P.M.— 08.0157 , $+0".004$ for A, $+08.0180$, $-0".006$ for B (Boss). The observations of this pair show no appreciable departure from uniform rectilinear motion. It is, however, difficult to believe that these two stars of magnitudes 6.0, 6.5, with observed separations of $10"$ to $6".5$ and with proper motions of over $0".2$ annually, are not physically connected. The relative motion from the micrometer observations is $".042$ in $109^\circ.7$. This motion will bring the stars within $2"$ in about 130 years. The observations may be summarised :—

1827	302°6	9"82
1854	304°2	8"73
1881	306°3	7"64
1908	309°0	6"55

If we assume that the motion is orbital, we deduce $p_1 = ".040$, $p_3 = ".094$. This pair should be observed for parallax. Spec. Par., $".038$.

11,732. $\beta 291$. Spec. F8. There has been a change in the position angle of $11^\circ.7$ in 30 years at $0".40$. The separation may be increasing. $p_1 = ".006$.

11,736. $\beta 701$. Spec. Ko. P.M.— 08.0120 , $+0".009$ (Porter). The position angle has decreased $17^\circ.5$ in 30 years at $1".25$. $p_1 = ".023$.

11,741. $\Sigma 2910$. Spec. Ko. The position angle has decreased $8^\circ.8$ in 80 years at $5".36$. $p_1 = ".033$.

11,743. $\Sigma 2909$. ζ Aquarii. Spec. F2. P.M.— 08.0138 , $+0".045$ for A and $+08.0115$, $+0".016$ for B (Boss). The motion of this well-known binary is shown by the following positions :—

1781	18°6	3"78
1826	358°3	3"71
1844	349°7	3"67
1862	340°8	3"56
1880	331°4	3"39
1898	320°5	3"12
1916	307°0	2"76

The period should be of the order of 500 years. From the above positions we derive the hypothetical parallax as follows :—

	p_1	p_2	p_3
1826-1862	".060	".073	".060
1844-1880	".060	".071	".061
1862-1898	".061	".076	".064
1880-1916	".064	".075	".068

Abs. Trig. Par., $".036$ (1). Spec. Par., $".025$ for first star and $".028$ for second star.

11,761. Krueger 60. Spec. Ma. P.M.— 08.0098 , $-0".34$ (Porter). Two orbits are given by Russell in *Publ. Amer. Astr. Soc.*, iii. 278 (also *Pop. Astr.*, xxv. 377). These orbits utilise much later observations than those made at Greenwich. The hypothetical parallax of the second orbit is $".157$. Abs. Trig. Par., $".261$ (4). Spec. Par., $".200$.

11,763. $\Sigma 2912$. 37 Pegasi. Spec. F5. P.M. $-0^s.0021$, $-0''.138$ (Boss). This is a binary, with the plane of the orbit at a very high inclination. Lewis, with no apparent justification, except the observation of Burnham in 1890, when the separation was given as $0''.1$, altered the quadrant of all observations after 1862. Burnham admits that his angle should be altered 180° . Both Burnham and Aitken consider that the observations may cover the maximum separation in the second quadrant. When, however, the distances are plotted against the time, they are seen to be rather discordant, and the maximum separation may have taken place considerably before 1830. On the other hand, the remarkable accuracy of Aitken's measures show quite definitely a maximum separation of $0''.36$ in the fourth quadrant in 1905. The following positions show the nature of the motion, but the small difference in the angle in the two parts of the orbit which have been observed have little significance:—

1830	113.7	1.20
1845	..	0.97
1860	118.2	0.68
1875	..	0.37
1890.56	167.0	0.10
1897	294.3	0.28
1905	..	0.36
1913	302.0	0.30

These give for the interval 1830-1875, $p_3 = ".026$. Spec. Par., $".011$.

11,895. Ho. 296. Spec. G4. P.M. $+0^s.0185$, $+0''.134$ (Boss). The position angle appears to be decreasing fairly rapidly. The brightness of the components and the large proper motion also indicate that this pair may have a large parallax. Spec. Par., $".038$.

11,908. $\Sigma 2934$. Spec. Go. This pair should be regularly observed, as the separation is now rapidly decreasing. The observations may be represented as follows, but the position for 1911 may not be so accurate as the others:—

1830	187.9	1.12
1845	178.8	1.20
1860	170.5	1.23
1875	162.2	1.20
1890	152.8	1.08
1905	138.8	0.81
1911	129.9	0.68

	p_1	p_2	p_3
1830-1860	.022	.031	.023
1845-1875	.022	.033	.022
1860-1890	.022	.036	.023
1875-1905	.024	.040	.029

11,943. $\beta 711$. The observations may be summarised as follows:—

1879	78.8	0.72
1891	56.3	0.82
1903	41.0	1.03
1915	30.0	1.29

These observations are represented by uniform rectilinear motion of $".027$ annually in $356^\circ.8$. However, the closeness of the pair indicates that the stars form a physical system. The motion is rapid for so faint a pair. $p_1 = ".029$, $p_3 = ".035$.

11,952. $\Sigma 2941$. This appears to be an optical pair.

11,968. $\Sigma 2944$. Spec. Go. P.M. $-0^s.0132$, $-0''.294$ (Boss). The stars A and B are physically connected, while C is only an optical member of the system. The relative motion of A and B is shown by:—

1833	246.6	4.20
1859	250.5	3.84
1885	255.2	3.50
1911	260.9	3.17

These give $p_1 = ".031$, $p_2 = ".025$, $p_3 = ".041$.

11,979. $\beta 1146$. Spec. B9. P.M. $0^s.0000$, $-0''.023$ (Greenwich, 1910). The position angle has decreased $34^\circ.0$ in 20 years at a mean separation of $0''.18$. The separation may be decreasing. $p_1 = ".007$.

12,008. Ho. 482. Spec. A3. P.M. $0^s.0000$, $+0''.004$ (Greenwich, 1910). Hough's original observations are:—

			n.
1889.81	160.±	0.3±	1
1891.74	121.±	0.35	1
1893.75	112.2	0.25	3

and there is a single observation by Aitken:—

			n.
1906.82	244.1	0.20	1

The quadrant is uncertain, but the observations taken together indicate a motion of at least 80° in 20 years at a mean separation of $0''.22$. $p_1 = ".011$.

12,036. $\beta 382$. Spec. A0. P.M. $-0^s.0015$, $0''.000$ (Boss). The motion is represented by the following positions:—

1876	205.3	1.08
1888	216.1	1.05
1900	228.1	0.96
1912	243.1	0.84

These positions give the hypothetical parallax as follows:—

	p_1	p_2	p_3
1876-1900	.027	.036	.027
1888-1912	.027	.032	.029

Abs. Trig. Par., $".018$ (1).

12,065. $\Sigma 2958$. Spec. A3. The position angle appears to have increased $5^\circ.2$ in 80 years at a separation of $3''.75$. $p_1 = ".016$.

12,090. O Σ 536. P.M. $+0^s.0265$, $-0''.151$ (Boss). It appears from Aitken's observations (*Publ. Lick. Obs.*, xii. 175) that there was a considerable decrease in the separation in 1912. Spec. Par., $".028$.

12,094. O Σ 483. 52 Pegasi. Spec. F0. P.M. $+0^s.0017$, $-0''.041$ (Boss). The position angle has increased $50^\circ.6$ at a nearly uniform rate in 70 years. The separation has been about $1''.00$. $p_1 = ".021$.

12,104. Hn. 56. Spec. F5. The position angle has decreased $10^{\circ}.6$ in 30 years at $0^{\circ}.93$. $p_1 = ".012$.

12,125. $\beta 1147$. 2 Andromedæ. Spec. A2. P.M. $+0^{\circ}.0055$, $-0^{\circ}.007$ (Boss). The following positions represent the motion:—

1890	315.0	0.26
1901	333.8	0.36
1912	344.6	0.45

These give $p_1 = ".012$, $p_3 = ".015$.

12,172. $\Sigma 2976$. The star C is only an optical member of the system.

12,178. $\Sigma 2979$. Spec. F2. The position angle has increased $5^{\circ}.7$ in 80 years at $3^{\circ}.06$. $p_1 = ".014$.

12,228. $\Sigma 2990$. Spec. F2. P.M. $-0^{\circ}.0007$, $-0^{\circ}.042$ (Bossert). The position angle has decreased $6^{\circ}.7$ in 80 years at a mean separation of $1^{\circ}.90$. The separation appears to have increased, as shown by:—

1830	69.2	1.60
1910	62.5	2.08

These give $p_1 = ".009$, $p_3 = ".017$.

12,276. $\beta 79$. P.M. $+0^{\circ}.0166$, $-0^{\circ}.091$ (Porter). The position angle has decreased nearly uniformly $48^{\circ}.3$ in 40 years at $0^{\circ}.89$. $p_1 = ".027$.

12,290. $\beta 80$. Spec. G5. P.M. $+0^{\circ}.0321$, $-0^{\circ}.110$ (Porter). A new orbit has been computed with a hypothetical parallax of $".032$. Abs. Trig. Par., $".011$ (4). Spec. Par., $".030$.

12,317. $\Sigma 3006$. Spec. K5. This appears to be a binary, as shown by:—

1825	183.3	4.50
1867	173.1	5.10
1909	165.0	5.64

These positions give $p_1 = ".049$, $p_2 = ".055$, $p_3 = ".056$.

12,340. $\Sigma 3008$. P.M. $-0^{\circ}.0008$, $-0^{\circ}.010$ (Boss). This is usually accepted as an optical pair. The uniformity of the motion at distances varying from $8''$ to about $3^{\circ}.5$ is fairly conclusive proof that it is so. The observations indicate a motion of B relative to A of $".069$ annually in the direction $119^{\circ}.1$. The following positions as far as 1909 have been obtained from an adjustment of the observations, the later ones are based on rectilinear motion:—

1825	274.3	8.00
1846	269.0	6.68
1867	261.6	5.46
1888	250.5	4.43
1909	232.3	3.65
1920	220.7	3.41
1930	209.0	3.35

12,381. $\Sigma 3014$. The separation appears to have increased from $7^{\circ}.11$ in 1830 to $8^{\circ}.05$ in 1910 with but little change in angle.

12,404. $\beta 1266$. Spec. F5. P.M. $+0^{\circ}.0061$, $+0^{\circ}.004$ (Greenwich, 1910). The comparison given below is with Aitken's orbit (*Publ. Lick. Obs.*, xii, 181):—

	Observed.	n.	Obs.—Comp.
1896.78	52.0	0.28	2 — 4.8 — ".01
1897.95	44.8	0.36	1 — 8.2 + .08
1898.71	54.0	0.35	1 + 3.6 + .08
1899.84	47.0	0.22	2 + 1.3 — .04
1901.01	31.7	0.14	1 — 9.0 — .09
1901.88	13.8	0.22	4 — 22.1 + .02
1902.82	13.1	0.19	5 — 16.3 + .01
1903.95	22.1	0.13	1 + 3.4 — .02
1913.79	206.4	0.16	1 — 21.6 — .02

12,432. $\beta 720$. 72 Pegasi. Spec. K2. P.M. $+0^{\circ}.0040$, $-0^{\circ}.012$ (Boss). The position angle has increased $49^{\circ}.0$ in 30 years at a nearly uniform rate. Separation, $0^{\circ}.40$. $p_1 = ".015$. Spec. Par., $".009$.

12,468. $O\Sigma 500$. Spec. B9. The observations are rather discordant, but the following positions may indicate the motion. The separation was probably considerably less at the time of discovery than it is now:—

1846	296.5	0.31
1867	313.0	0.41
1888	322.8	0.52
1909	329.4	0.61

These positions give $p_1 = ".008$, $p_3 = ".010$.

12,479. $\Sigma 3028$. This appears to be an optical system with relative motion, shown by:—

1830	205.2	19.50
1905	202.8	17.40

12,510. $\beta 858$. Spec. A0. The position angle of the close pair has decreased $16^{\circ}.6$ in 22 years. The mean separation has been $0^{\circ}.62$, but this may be increasing. $p_1 = ".014$.

12,531. $\Sigma 3033$. Spec. F2. The position angle has decreased $4^{\circ}.5$ in 80 years at $3^{\circ}.22$. $p_1 = ".012$.

12,532. A. G. Clark 14. 78 Pegasi. Spec. K0. P.M. $+0^{\circ}.0054$, $-0^{\circ}.036$ (Boss). The position angle appears to have increased $7^{\circ}.8$ in 30 years at $1^{\circ}.43$. $p_1 = ".015$. Spec. Par., $".017$.

12,552. $\Sigma 3039$. This is an optical pair.

12,562. $\beta 995$. Spec. B3. The position angle has decreased $11^{\circ}.9$ in 28 years at $0^{\circ}.83$. $p_1 = ".012$.

12,563. $\Sigma 3041$. Spec. G. P.M. $+0^s.0066$, $-0''.055$ (Bossert). The position angle of the pair BC has decreased $4^\circ.0$ in 80 years at $3''.28$. $p_1 = .012$.

12,601. $\Sigma 3042$. The separation appears to have increased from $4''.22$ in 1830 to $4''.94$ in 1910.

12,675. $\Sigma 3050$. Spec. F8. P.M. $-0^s.0055$, $-0''.081$ (Boss). This appears to be a real binary, showing curvature of the path.

	$^{\circ}$	$''$
1830	190.3	3.92
1850	195.1	3.61
1870	201.0	3.21
1890	208.7	2.78
1905	216.3	2.44
1920	226.0	2.11

These positions give the following values of the hypothetical parallax:—

	p_1	p_2	p_3
1830-1870	.040	.062	.051
1850-1890	.041	.049	.054
1890-1920	.045	.042	.054

12,696. Hn. 60. A new orbit has been computed. Hyp. Par., $''034$.

12,701. $\beta 733$. 85 Pegasi. Spec. Go. P.M. $+0^s.0622$, $-0''.986$ (Boss). The following comparison is with the orbit by Bowyer and Furner (*M.N.R.A.S.*, lxvi. 423):—

	Observed.	n.	Obs.—Comp.
1894.89	162.8	0.85	1 -20.9 +.09
1895.46	194.3	0.47	2 + 5.7 -.28
1898.52	222.4	0.64	3 + 5.5 -.08
1901.91	242.1	0.68	4 - 6.0 -.07

Hypothetical parallax, $''074$. Abs. Trig. Par., $''096$ (5). Spec. Par., $''091$.

12,709. $\beta 281$. Spec. Go. P.M. $+0^s.0027$, $-0''.065$ (Bossert). The observations are represented by:—

1878	216.3	1.13
1895	204.7	1.38
1912	196.0	1.51

These positions give $p_1 = .026$, $p_3 = .030$.

ORBITS

OF

25 DOUBLE STARS

THE notation used in the description of the following orbits is:—

T =time of periastron.

P =period in years.

$n = 360^\circ/P$ =annual mean motion. This has been considered positive when the motion is in the direction of increasing position angles, negative in the opposite direction.

a =semi-major axis of the true orbit, expressed in seconds of arc.

e =eccentricity.

i =inclination of the orbit plane to the tangent plane of the sphere. Positive and negative values of i are indistinguishable.

Ω =position angle of the line of intersection of the orbit plane and tangent plane. Ω is always taken as less than 180° .

ω =angle between the line of nodes and the periastron measured from the line of nodes in the direction which projects to increasing position angles.

482.

Σ 73.

B.D. 22°, 146.

R.A. 0^h 50^m 56^s.
Dec. +23° 14'.

Mags. 6.2, 6.8
Spec. Ko.

P.M. 0^m.142 in 103°·4 (Boss).

This star is 36 Andromedæ, and was discovered to be double by Struve. It has been regularly observed for 90 years, during which time the position angle has increased 100°, while the separation increased from 0^m.8 to 1^m.3 and then decreased to 0^m.9. The separation is steadily decreasing, and this will become a very close pair as the companion describes the second and third quadrants. The angular motion is now about 2° a year, but it shall become much faster. The pair should be regularly observed while the unobserved part of the orbit, amounting to 260°, is observed in the next 30 years or so. The period of 124 years given below may be in error by about 10 years. It may be compared with the periods of 115 and 109 years given by Bowyer and Rabe respectively. Earlier orbits had much longer periods, but these were computed from much smaller arcs. The eccentricity is large and rather uncertain, as the periastron passage has not been observed; if the period is longer than that given, the eccentricity will be less. The apparent orbit was computed from the following positions:—

1835	312.9	0.97
1855	336.5	1.25
1875	354.5	1.30
1895	13.5	1.20
1915	39.1	0.96

the last being a slight extrapolation as the last observation used was for 1913.8.

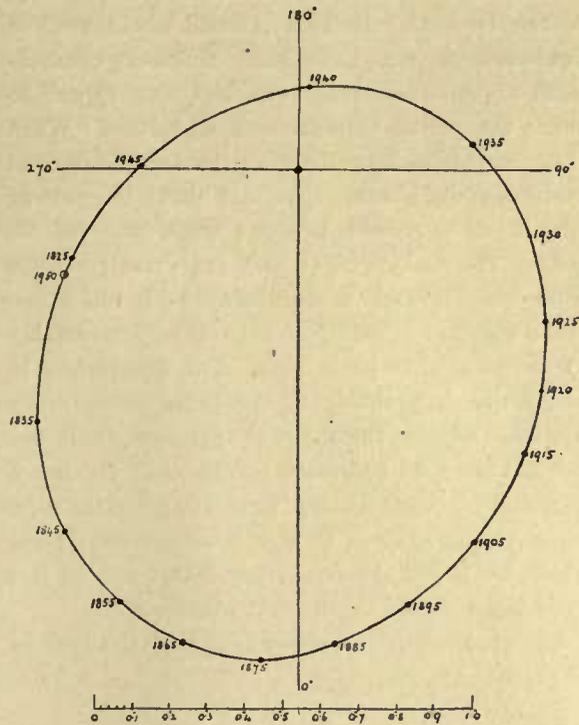
The elements were found as follows:—

T 1815.93	a 0.97	i 41.2
P 124.2 years	e 0.708	Ω 105.7
n +2°.897		ω 76.5

Ephemeris.

1825	291.5	0.648
1835	313.9	0.959
1845	327.0	1.134
1855	337.3	1.231
1865	346.4	1.277
1875	355.3	1.280
1885	4.3	1.246
1895	14.1	1.173
1905	25.4	1.083
1915	39.4	0.948
1920	48.2	0.863
1925	59.2	0.762
1930	74.0	0.635
1935	98.3	0.459
1940	172.4	0.221
1945	269.8	0.431
1950	293.9	0.678

Apparent Orbit of Σ 73.



Observed.			Obs.—Comp.			
1832.1	307.8	0.85	Σ	3	-1.0	-0.04
1836.9	320.5	0.94	Σ	3	+3.5	-0.06
1841.6	324.2	1.30	OΣ	3	+0.9	+0.22
1846.8	328.6	1.21	OΣ	1	-0.5	+0.05
1854.7	335.9	1.33	OΣ	3	-1.0	+0.10
1858.0	340.1	1.33	Ma	4	+0.1	+0.08
1861.7	344.4	1.36	OΣ	1	+1.0	+0.09
1863.7	344.4	1.16	Δ	13	-0.8	-0.12
1866.5	346.6	1.21	Δ	11	-1.1	-0.07
1869.8	349.7	1.26	Δ	4	-0.9	-0.03
1872.6	352.5	1.37	Δ	6	-0.6	+0.09
1875.5	355.2	1.29	Δ	7	-0.6	+0.01
1877.5	356.4	1.32	Δ	3	-1.0	+0.05
1882.0	1.2	1.34	Sp.	4	-0.3	+0.08
1885.2	4.3	1.32	Sp.	4	-0.2	+0.07
1887.0	7.9	1.23	Hl.	4	+1.7	.00
1888.0	7.7	1.18	Sp.	6	+0.5	-0.05
1889.9	9.6	1.17	Hl.	3	+0.5	-0.04
1893.0	11.4	1.27	Maw	4	-0.8	+0.08
1896.8	14.2	1.15	Gr.	12	-1.8	-0.01
1898.0	17.1	1.24	A.	3	-0.2	+0.09
1900.6	19.0	0.93	Gr.	12	-1.2	-0.20
1900.6	18.0	1.13	A.	3	-2.2	.00
1903.7	24.0	1.01	Gr.	14	+0.2	-0.09
1907.1	28.1	0.98	Gr.	12	+0.1	-0.08
1910.5	34.0	0.82	Gr.	8	+1.3	-0.19
1911.6	35.6	0.96	A.	2	+1.4	-0.04
1913.8	35.9	0.83	Gr.	8	-1.5	-0.14
1915.1	37.3	0.83	Do.	3	-2.2	-0.12
1917.2	48.9	0.82	Do.	3	+5.6	-0.09
1918.1	44.0	0.85	Lv.	4	-0.6	-0.05
1919.1	47.1	0.73	Lv.	3	+0.7	-0.15
1920.0	51.5	0.75	Do.	4	+3.3	-0.11

The agreement in angle is quite satisfactory till 1920, but all the recently measured distances are smaller than the computed. This may indicate that the period is rather less than that given.

1144.

Σ 228.

B.D. 46°, 536.

R.A. 2^h 9^m 13^s.
Dec. +47° 8'.

Mags. 6.7, 7.6.
Spec. Fo.

P.M. 0".112 in 225°.3 (Greenwich).
Abs. Trig. Par. ".075 (Sproul). Spec. Par. ".025.

The following orbit has been computed from observations extending from Struve in 1831 to Aitken in 1912. In that interval about 200° of position angle were described. The early observations are not very numerous, but they appear to cover the period of maximum separation. When the companion has distinctly passed the second position of maximum separation about the present time it will be possible to give a much more reliable orbit. The periods of 88 and 123 years given by Gore and Doberch are probably both too short. Rabe obtained a period of 205 years, considerably in excess of that given here. The uncertainty in the period is probably of the order of 30 years. The orbit satisfies the observed angles very well, but not the observed separation. This is at no time a very difficult pair with large refractors; the minimum separation of about a third of a second was passed about 1885, and the separation should not be less than half a second for the next century.

The apparent orbit was observed analytically from the following positions:—

1830	262.3	1.08
1860	286.6	0.96
1880	327.0	0.45
1890	39.0	0.36
1910	101.7	0.76

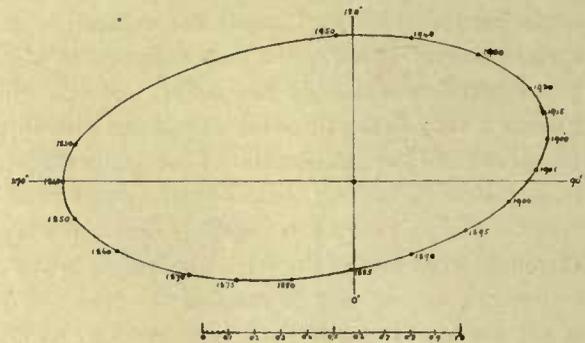
The elements found were:—

T 1894.50	a 0.974	i 61.3
P 167.4 years	e 0.313	Ω 99.7
n +2°.150		ω 303.7

Ephemeris.

1830	262.4	1.084
1840	270.0	1.122
1850	277.6	1.087
1860	286.3	0.964
1870	299.1	0.742
1875	309.5	0.598
1880	326.9	0.450
1885	357.8	0.340
1890	38.0	0.358
1895	66.2	0.472
1900	82.5	0.601
1905	93.4	0.702
1910	102.1	0.762
1915	109.8	0.781
1920	117.6	0.768
1930	135.1	0.685
1940	158.1	0.594
1950	186.5	0.566

Apparent Orbit of Σ 228.



	Observed.			Obs.—Comp.	
1831.46	262.1	1.08	Σ	5	-1.4 -0.02
1841.95	272.3	1.21	OΣ	2	+0.8 +0.09
1845.18	275.6	0.96	Ma	3	+1.7 -0.15
1852.19	280.2	1.11	Ma	1	+0.9 +0.04
1857.62	286.8	0.99	Se	3	+2.7 -0.01
1862.96	286.5	0.91	Δ	4	-3.0 0.00
1870.18	299.6	0.86	OΣ	1	+0.2 +0.12
1874.90	309.4	0.71	Δ	2	+0.2 +0.11
1877.12	313.0	0.54	Hl.	4	-2.5 0.00
1881.96	336.2	0.41	Hl.	2	-0.2 +0.01
1889.48	34.1	0.43	Hl.	6	+0.1 +0.08
1894.67	62.4	0.49	HΣ	4	-2.4 +0.03
1897.87	77.2	0.60	Hu, A.	6	+0.8 +0.05
1899.4	81.1	0.44	Gr.	12	+0.1 -0.15
1900.45	84.7	0.63	A.	4	+1.0 +0.02
1903.99	90.8	0.65	Bies.	2	-0.7 -0.03
1904.76	90.9	0.60	A.	2	-2.1 -0.10
1906.27	91.7	0.56	A.	2	-3.8 -0.16
1911.6	108.8	0.62	Gr.	4	+4.3 -0.15
1912.75	103.1	0.73	A.	1	-3.4 -0.04
1912.81	108.6	0.70	V	4	+2.1 -0.07
1913.07	108.3	0.73	Bies.	4	+1.5 -0.04
1914.97	113.1	0.70	Do.	3	+3.3 -0.08
1915.15	114.6	0.73	Bies.	2	+4.6 -0.05
1916.46	111.8	0.55	Do.	4	-0.2 -0.23
1919.88	116.5	0.59	Do.	3	-0.9 -0.18

The observed angles agree satisfactorily, but recent measures of distance appear to be too small in comparison with the earlier ones.

1761.

R.A. $3^h 29^m 59^s$.
Dec. $+24^\circ 13'$.

Σ 412.

Mags. 6.6, 6.7.
Spec. A2.

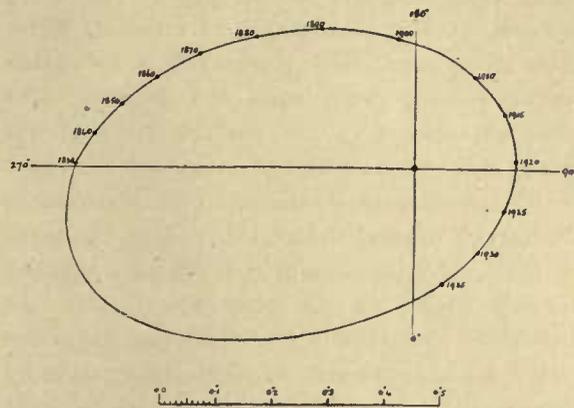
B.D. $23^\circ, 473$.

P.M. $0^m.032$ in $146^\circ.6$ (Boss).

This star is 7 Tauri. The orbit has been deduced by Zwiers' method from observations beginning with Struve in 1828 and ending with the Greenwich observations in 1913. In that interval about 140° were described, while the separation steadily decreased from $0''.6$ to $0''.2$. The resulting orbit practically satisfies an observation made by Leavenworth in 1919 and one at Greenwich in 1921, when a further 35° had been described. This pair deserves careful attention, as the angular motion should be about 5° annually for the next 15 years with a nearly constant separation of about $0''.2$. As the early observations do not cover the time of maximum separation, there must be considerable uncertainty in the period, probably 50 years at least. Aitken has given (*Publ. A.S.P.*, xxxii. 216) an orbit with a period of 270 years, as compared with 217 years given below, while the semi-major axis of $0''.49$ is correspondingly larger. The elements can only be considered provisional.

T 1919.37	a $0''.407$	i $37^\circ.0$
P 216.9 years	e 0.545	Ω 106.5
n $-1^\circ.66$		ω 350.0

Apparent Orbit of Σ 412.



Ephemeris.			Observed.		Obs.—Comp.	
1830	$269^\circ.3$	$0''.602$	$269^\circ.9$	$0''.69$	Σ 5	$+0''.8$ $+''09$
1840	$264^\circ.0$	$0''.573$	$265^\circ.7$	$0''.75$	$O\Sigma$ 3	$+2.9$ $+1.8$
1850	$258^\circ.0$	$0''.536$	$256^\circ.8$	$0''.42$	Se 3	$+3.1$ -0.9
1860	$251^\circ.0$	$0''.488$	$233^\circ.9$	$0''.47$	Sp. 7	$+1.2$ $+0.9$
1870	$242^\circ.4$	$0''.432$	$228^\circ.9$	$0''.27$	En. 7	$+2.1$ -0.8
1880	$230^\circ.8$	$0''.367$	$215^\circ.6$	$0''.27$	Sp. 8	-4.2 -0.5
1885	$223^\circ.4$	$0''.333$	$203^\circ.5$	$0''.24$	Sp. 7	-14.5 -0.7
1890	$214^\circ.1$	$0''.298$	$216^\circ.4$	$0''.30$	β 4	$+1.7$ $.00$
1895	$202^\circ.4$	$0''.264$	$199^\circ.5$	$0''.34$	Gr. 8	$+1.6$ $+0.9$
1900	$187^\circ.6$	$0''.234$	$185^\circ.9$	$0''.23$	A. 4	-2.5 -0.1
1905	$169^\circ.0$	$0''.211$	$189^\circ.5$	$0''.23$	Gr. 11	$+7.1$ $.00$
1910	$146^\circ.7$	$0''.196$	$165^\circ.8$	$0''.16$	β 1	-3.8 -0.5
1915	$121^\circ.8$	$0''.188$	$152^\circ.9$	$0''.28$	Bies. 2	-3.0 $+0.8$
1920	$95^\circ.0$	$0''.182$	$147^\circ.6$	$0''.22$	Gr. 4	$+0.9$ $+0.2$
1925	$66^\circ.3$	$0''.177$	$127^\circ.7$	$0''.17$	A 2	-5.7 -0.2
1930	$38^\circ.1$	$0''.186$	$131^\circ.1$	$0''.21$	Gr. 7	$+3.4$ $+0.2$
1935	$14^\circ.2$	$0''.210$	$95^\circ.0$	$0''.24$	Lv. 1	-1.8 $+0.6$
			$92^\circ.7$	$0''.19$	Gr. 1	$+4.3$ $+0.1$

2093.

O Σ 77.

B.D. 31°, 737.

R.A. 4^h 11^m 9^s.

Mags. 7.5, 7.5.

P.M. 0^m.051 in 188°·7 (Greenwich, 1910).

Dec. +31° 31'.

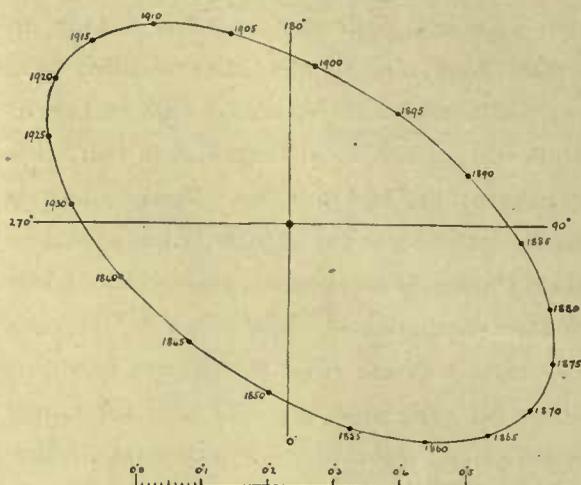
Spec. F8.

The components of this binary are nearly equal in brightness, and the separation is always under half a second. Consequently, all the observations are uncertain as to quadrant. Previous to Burnham's observations in 1878 there were observations on five nights only, and of these the observation by Secchi in 1859 cannot be reconciled with the others. The mean of the four observations by Otto Struve and Maedler were taken as defining one position angle. The result, however, cannot be regarded as satisfactory, for these observations show if anything a retrograde motion in six years, while the deduced orbit gives an increase in the position angle of 37° in the same period. The observations from 1878 to 1916 were available for computing the orbit. During this interval the angular motion amounted to 160°. The accuracy of the elements obtained depends largely on the early observations. At present the companion is near maximum elongation in the second quadrant. A single observation by Leavenworth in 1919 is given in the comparison of observed with computed positions. The elements have been computed by Zwiers' method. The orbit is nearly circular.

T 1917.21	a 0 ^{''} .44	i 58°·2
P 95.2 years	e 0.05	Ω 55.3
n +3°·788		ω 174.8

Ephemeris.

1840	287.5	0 ^{''} .267
1845	319.7	0 ^{''} .233
1850	353.3	0 ^{''} .257
1855	17.0	0 ^{''} .321
1860	32.4	0 ^{''} .388
1865	43.7	0 ^{''} .439
1870	53.1	0 ^{''} .461
1875	62.7	0 ^{''} .451
1880	72.5	0 ^{''} .413
1885	85.8	0 ^{''} .351
1890	105.5	0 ^{''} .280
1895	135.8	0 ^{''} .234
1900	171.1	0 ^{''} .245
1905	197.5	0 ^{''} .303
1910	214.8	0 ^{''} .367
1915	227.6	0 ^{''} .409
1920	238.8	0 ^{''} .416
1925	250.5	0 ^{''} .388
1930	265.4	0 ^{''} .331
1935	287.3	0 ^{''} .268

Apparent Orbit of O Σ 77.

	Observed.			Obs.—Comp.	
1846.06	338 ^{''} .2	0 ^{''} .37	O Σ 2	+11 ^{''} .5	+ ^{''} .14
1846.12	330.1	0.35	Ma 1	+ 3.0	+ ^{''} .12
1852.19	337.3	0.3 \pm	Ma 1	-27.5	+ ^{''} .02
1859.05*	250 \pm	..	Se 1	..	..
1878.50	69.3	0.44	β 4	+ 0.1	+ ^{''} .01
1889.81	105.2	0.25 \pm	H Σ 1	+ 0.5	- ^{''} .03
1895.16	141.1	0.25 \pm	H Σ 1	+ 4.2	+ ^{''} .02
1896.90	148.6	0.22	A. 3	- 0.6	- ^{''} .01
1899.10	166.1	0.24	Gr. 3	+ 1.3	0.00
1899.63	170.1	0.22	Hu. 3	+ 1.6	- ^{''} .02
1900.77	178.1	0.22	A. 3	+ 2.4	- ^{''} .03
1901.12	178.0	0.22	Gr. 1	+ 0.2	- ^{''} .03
1902.79	187.6	0.26	A. 1	+ 1.1	- ^{''} .01
1903.08	195.4	0.23	Gr. 2	+ 7.4	- ^{''} .05
1903.87	198.1	0.26	A. 2	+ 6.1	- ^{''} .02
1905.44	205.2	0.27	A. 2	+ 5.6	- ^{''} .04
1907.23	197.8	0.28	Gr. 1	- 7.9	- ^{''} .05
1908.83	202.6	0.25	Gr. 3	- 8.7	- ^{''} .10
1911.10	210.6	0.29	J 2	- 7.4	- ^{''} .09
1912.55	222.7	0.46	A. 2	+ 0.7	+ ^{''} .07
1914.10	223.2	0.37	Gr. 6	- 2.4	- ^{''} .03
1916.88	232.1	0.38	J 3	+ 0.2	- ^{''} .04
1919.68	231.7	0.50	Lv. 1	- 6.4	+ ^{''} .08

* Computed position, 29°·8, 0^{''}.38.

2383.

β 552.

B.D. 13°, 728.

R.A. 4^h 47^m 35^s.
Dec. +13° 32'.

Mags. 7.0, 10.0.
Spec. F5.

No evidence of P.M. (Porter).

Par. Abs. Trig. ".007 (Flint). Spec. ".028.

The orbit of this pair was investigated by See in 1907, but in 5 years his orbit proved to be seriously in error. The orbit has recently been computed by Russell and Aitken, who obtained elements in close agreement with those given below. The angular motion in the 38 years from 1874 to 1912 was about 270°, but systematic observations have only been made since 1889. There are no reliable observations for the interval 1877 to 1889, when 145° of position angle were described. The orbit thus largely depends on the estimates made by Burnham in 1874 and 1877. The first of these observations was made with a 6-inch telescope, and the note added, "possibly a close pair." The second, made with the 18½-inch telescope of the Dearborn Observatory, was considered as the real discovery observation. Both observations appear to be fundamentally correct.

The apparent orbit has been computed analytically from the positions:—

1875	340.0	0.360
..	60.0	0.214
1889	144.0	0.370
1901	208.7	0.443
1913	248.0	0.625

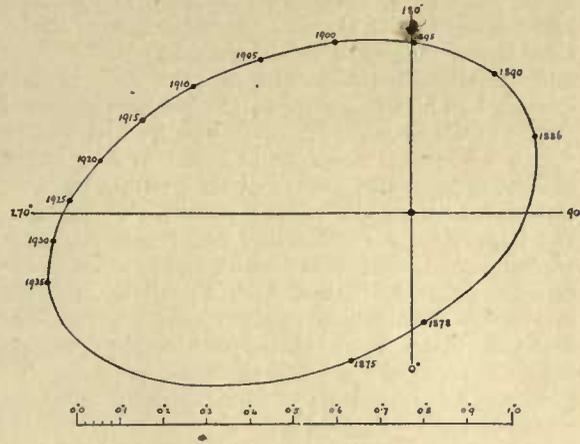
The resulting orbit does not satisfy the observations of H. Struve in 1886. The single observations by Burnham in 1902 and Biesbroeck in 1909 leave residuals of 13°, but all the other observations except one are satisfied within 7°. On account of the difference in magnitude of the components this is at all times a difficult pair, so that on the whole the observations may be considered to be well represented.

T	1882.85	a 0.627	i 50.4
P	88.2 years	e 0.519	Ω 122.0
n	+4°.083		ω 316.3

Ephemeris.

1875	337.7	0.367
1878	6.6	0.251
1886	122.3	0.334
1890	149.5	0.376
1895	178.8	0.396
1900	204.4	0.435
1905	224.7	0.500
1910	239.8	0.579
1915	251.2	0.658
1920	260.4	0.728
1925	268.0	0.787
1930	274.4	0.827
1935	280.8	0.851

Apparent Orbit of β 552.



Comparison of Observations with Ephemeris:—

	Observed.				Obs.—Comp.	
1874.95	340±	0.5±	β		+ 2.7	+ 13
1877.97	360±	0.8±	β	1	- 6.3	+ 55
1889.19	144.7	0.35±	Sp.	1	+ 0.4	- 02
1890.96	156.7	0.33	β	3	+ 1.1	- 05
1891.13	153.8	0.3±	Sp.	8	- 2.7	- 08
1893.07	165.3	0.35±	Sp.	1	- 2.5	- 04
1894.15	178.2	0.38±	Sp.	2	+ 4.1	- 01
1894.88	177.0	0.40	Bar.	2	- 1.1	- 00
1896.11	179.9	0.35±	Sp.	7	- 4.9	- 05
1896.84	187.7	0.43	Hu.	1	- 1.0	+ 02
1896.88	186.2	0.40	A.	3	- 2.7	- 01
1897.13	193.5	0.25±	Sp.	2	+ 3.3	- 16
1897.82	193.7	0.44	A.	5	- 0.3	+ 02
1897.95	193.4	0.43	Hu.	3	- 1.2	+ 01
1898.00	191.0	0.42	Gr.	2	- 3.9	00
1898.12	197.2	0.43	A.	3	+ 1.7	+ 01
1898.74	199.1	0.45	A.	3	+ 0.6	+ 03
1899.16	206.1	0.37	Gr.	1	+ 5.4	- 06
1899.75	202.3	0.60	See	1	- 1.0	+ 17
1899.79	202.8	0.45	A.	3	- 0.7	+ 02
1900.18	207.9	0.45	Gr.	2	+ 2.5	+ 01
1900.64	205.4	0.41	A.	3	- 2.0	- 03
1900.78	203.2	0.49	Doo.	3	- 4.8	+ 05
1901.72	205.8	0.43	A.	2	- 6.3	- 03
1901.98	203.3	0.56	Doo.	2	- 10.0	+ 10
1902.74	229.3	0.32	β	1	+ 13.1	- 15
1903.14	220.0	0.40	A.	2	+ 2.4	- 07
1904.19	217.8	0.52	Bies.	2	- 4.0	+ 03
1905.90	227.9	0.46	A.	2	- 0.1	- 05
1908.01	240.0	0.57	Doo.	5	+ 5.8	+ 02
1908.15	239.7	0.42	A.	1	+ 5.1	- 13
1908.84	234.6	0.50	A.	2	- 2.0	- 06
1909.08	250.7	0.53	Bies.	1	+ 13.3	- 04
1909.18	231.0	0.48	Gr.	1	- 6.7	- 09
1912.91	247.8	0.66	A.	2	+ 1.0	+ 04
1913.02	247.2	0.56	Bies.	2	+ 0.6	- 07

4355.

R.A. 7^h 53^m 26^s.
Dec. +1° 20'.

OS 185.

Mags. 6.8, 7.0.
Spec. F8.

B.D. 1°, 1959.

P.M. 0".178 in 269°.0 (Porter).

The following is a short history of this pair:—

It was measured by both Otto Struve and Maedler between 1843 and 1850. The separation was under 0".5, and for a mean epoch of 1845.27 the position angle was 23°.6. Secchi in 1855 gave the position angle as 265°.0 with the note "apparently separated." Otto Struve suspected an elongation at 198° in 1861 and at 240° in 1869. But in 1870 and 1873 it appeared to him to be single. It had also appeared single to Dembowski in 1866, but he had only a 7-inch telescope. Schiaparelli failed to separate it in 1877, 1879, 1882, 1883, and on 5 nights in 1887, although he used the 18-inch telescope at Milan in the latter year. Engelmann, using only a 7-inch telescope, measured it on 5 nights in 1883. Reliable observations commenced with Burnham in 1890, and since that time a very consistent series of measures have been made. When the position angles are plotted against the time the points lie very near to a smooth curve from which the following positions have been read off:—

1891.0	6.0	1907.5	26.3
1896.5	15.3	1913.0	33.6
1902.0	21.3		

It thus seems clear that there is a fairly rapid direct motion. The angular motion was a minimum about 1905, indicating a maximum separation at that time. The maximum separation did not exceed 0".4.

Now the position angle corresponding to the maximum separation of 1905 agrees almost exactly with the position angle observed by Otto Struve and Maedler. The only difficulty in the interpretation of the observations is due to the approximate equality of the two components. It is just possible, though very unlikely, that only 180° of the orbit were described in the 60 years to 1905. The orbit given below is based on the assumption that the period is about 60 years and that the elongations observed by Otto Struve in 1861 and 1869 are substantially correct. The observation by Secchi in 1855 and those by Engelmann in 1883 are not satisfied. A single queried observation of Schiaparelli in 1887 is satisfied to 20° if the position angle is altered 180°.

It must be admitted that the orbit given below may be considerably in error as a result of all reliable observations lying within 30° of position angle. It is probable, however, that the period is near that given, and the inclination must be large. An orbit could be obtained giving a better fit with the observations utilised, but this appears to be unnecessary on account of the uncertainties in the observations. For example, an increase in the period of half a year would give a much better fit for the observations of 1861 and 1869 without altering the ephemeris at the times of other observations by more than a fraction of a degree. Observations made at the present time with a powerful refractor will be very useful, as the companion is now in a part of the orbit for which there are no observations. If the hypothesis on which the present orbit is based is correct, observations during the next ten years will serve for the determination of an accurate set of elements.

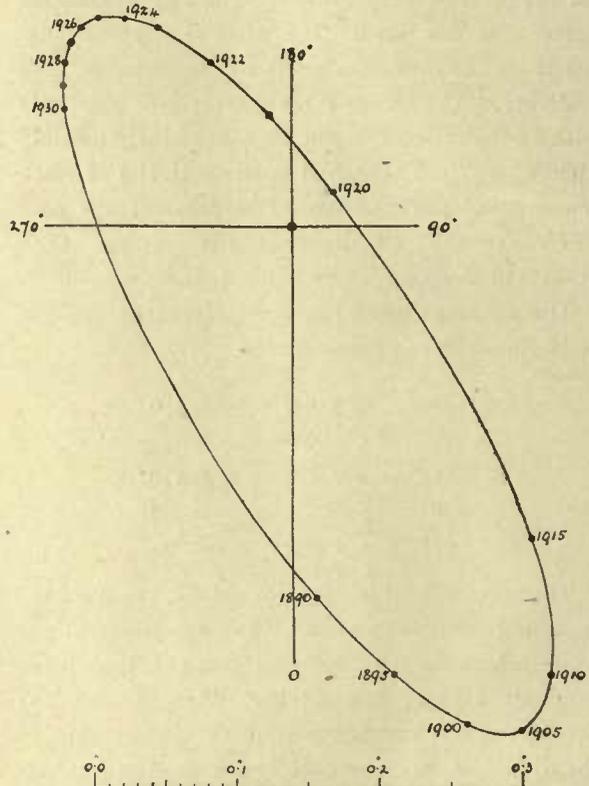
The orbit has been computed by Zwiers' method:

T	1861.16	a	0.350	i	74.6
P	59.6 years	e	0.611	Ω	35.2
n	+6°.04			ω	114.9

Ephemeris.

1890	3.4	0.261	1923	214.1	0.169
1895	12.5	0.323	1924	218.9	0.191
1900	19.0	0.369	1925	222.9	0.202
1905	24.3	0.388	1926	226.6	0.205
1910	29.7	0.364	1927	230.4	0.203
1915	37.4	0.264	1928	234.2	0.197
1920	131.1	0.037	1929	238.4	0.189
1921	192.7	0.080	1930	243.0	0.180
1922	207.1	0.131			

Apparent Orbit of OS 185.



Comparison of Observations with Ephemeris:—

	Observed.	Obs.—Comp.				
1843.26	25.0	0.45	Ma	2	+ 2.8	+0.7
1844.28	20.2	0.32 ±	OS	2, 1	- 3.0	-0.7
1850.28	24.1	0.42 ±	OS	1	- 5.5	+0.6
1855.29	265.0		Se.	1	..	..
1861.25	198	Elong.?	OS	1	+10	..
1869.24	240	Elong.?	OS	1	+ 2	..
1883.85	28.4	0.28	En.	5	..	..
1887.16	337	?	Sp.	1	-19	..
1890.96	6.0	0.22	β	3	+ 0.5	-0.5
1892.18	9.4	0.25	β	3	+ 1.6	-0.4
1897.58	16.4	0.34	Gr.	5	+ 0.4	-0.1
1898.10	17.6	0.53	Hu.	3	+ 0.7	+1.8
1898.18	22.3	0.29	Brown	1	+ 5.3	-0.7
1899.31	17.8	0.35	Brown	2	- 0.4	-0.1
1902.01	21.7	0.34	Gr.	5	+ 0.4	-0.4
1903.82	22.8	0.42	Bies.	3	- 0.4	+0.3
1906.15	24.5	0.34	A.	1	- 1.0	-0.5
1906.64	25.2	0.46	Doo.	4	- 0.8	+0.8
1909.29	28.0	0.32	A.	1	- 0.9	-0.5
1910.14	30.2	0.38	Gr.	3	+ 0.3	+0.2
1911.91	31.1	0.39	Gr.	3	- 0.9	+0.5
1914.60	39.3	0.33	Gr.	3	+ 2.9	+0.5

Between 1860 and 1885 the separation did not reach 0".25, and this gives a complete explanation of the negative observations of that period.

5223.

OS 208.

B.D. 54°, 1331.

R.A. 9^h 47^m 1^s.
Dec. +54° 25'.

Mags. 5.0, 5.6.
Spec. A2.

P.M. 0".009 in 360° (Boss).

This binary is well known as ϕ Ursæ Majoris. In 1875 Casey determined the period as 115.4 years. Later computers considerably reduced the period, Glasenapp finding 91.92 years; See, 97.0; and Doberck, 97.70. The period of 110.1 years given below is probably correct within two or three years.

Over 300° of the apparent orbit have been described since the early observations of Otto Struve and Maedler; and although few observations were made between 1865 and 1890, when the separation was small, they serve to fix the periastron passage with considerable accuracy. During the next 30 years the relative motion will be fairly slow with the separation exceeding 0".4.

The orbit has been deduced from the following positions:—

1844	7.1	0.385
1862	46.3	0.288
..	135.0	0.176
1894	259.0	0.218
1912	308.6	0.388

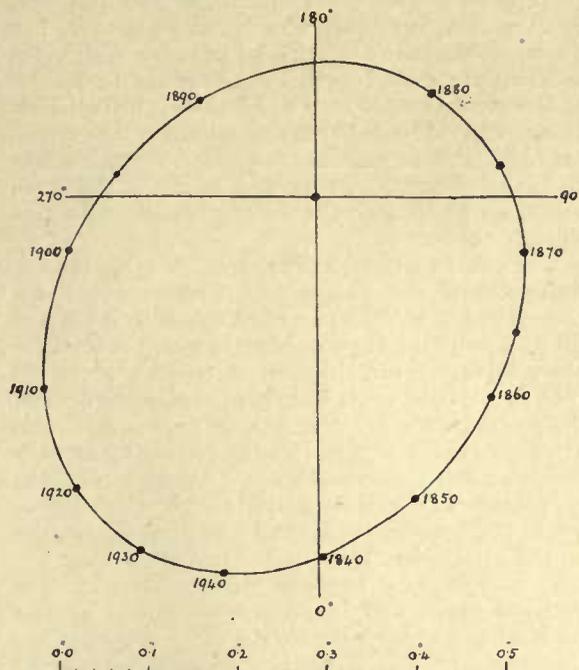
These give the elements as follows:—

T 1883.61	a 0.319	i 32.2
P 110.1 years	e 0.473	Ω 124.6
n +3°.268		ω 44.5

Ephemeris.

1840	0.3	0.404
1845	8.4	0.382
1850	17.5	0.357
1855	28.0	0.329
1860	40.5	0.300
1865	55.6	0.270
1870	74.8	0.241
1875	99.1	0.211
1880	131.9	0.178
1885	179.0	0.151
1890	230.2	0.170
1895	262.8	0.226
1900	281.9	0.285
1905	294.8	0.335
1910	304.7	0.374
1915	312.9	0.403
1920	320.2	0.424
1925	326.8	0.436
1930	333.2	0.442
1935	339.6	0.440
1940	346.0	0.434
1945	352.8	0.422
1950	0.1	0.404

Apparent Orbit of OS 208.



Comparison of Observations with Ephemeris:—

	Observed.		Obs.—Comp.			
1842.30	4.2	0.42	Ma	1	+ 0.4	+ .03
1843.11	8.0	0.48	OS	4	+ 3.1	+ .09
1846.01	13.8	0.45	Ma	3	+ 3.8	+ .07
1847.65	10.5	0.37	OS	4	- 2.7	.00
1851.25	14.9	0.32	OS	7	- 5.3	-.03
1851.90	28.5	0.28	Ma	8	+ 7.4	-.07
1853.64	18.3	0.36	OS	4	- 6.7	+ .02
1858.80	36.7	0.38	OS	5	- 0.7	+ .07
1861.74	47.9	0.37	OS	3	+ 2.5	+ .08
1865.42	48.3	0.25	OS	2	- 8.7	-.02
1872.42	77.6	0.23	OS	2	- 8.9	.00
1882.19	139.0	0.2 ±	En.	4	- 12.4	+ .04
1887.43	218.9	0.23	Sp.	4	+ 13.1	+ .07
1892.13	250.8	0.24	β	3	+ 3.6	+ .05
1896.92	267.2	0.25	A.	2	- 3.6	.00
1898.18	277.7	0.43	Hu.	3	+ 2.0	+ .17
1899.1	282.1	0.30	Gr.	5	+ 3.2	+ .03
1899.31	286.6	0.39	Brown	3	+ 7.0	+ .11
1901.9	288.4	0.31	Gr.	11	+ 1.2	+ .01
1903.32	290.3	0.32	Bies.	4	- 0.8	.00
1903.38	285.6	0.30	A.	2	- 5.7	-.02
1905.35	294.3	0.32	A.	2	- 1.4	-.02
1908.09	295.7	0.37	Bies.	3	- 5.4	+ .01
1909.17	302.5	0.38	Bies.	2	- 0.9	+ .01
1910.35	307.9	0.44	Bies.	2	+ 2.6	+ .06
1911.26	307.0	0.36	V.	5	0.0	-.02
1911.34	310.0	0.41	Bies.	1	+ 2.9	+ .03
1911.9	309.5	0.33	Gr.	5	+ 1.4	-.05
1912.12	308.5	0.40	A.	2	0.0	+ .01
1912.45	310.0	0.50	Bies.	3	+ 0.9	+ .11

6158.

Σ 1639.

R.A. 12^h 20^m 40^s.
Dec. +26° 0'.

Mags. 6.7, 7.9
Spec. A5.

This binary was investigated by Lewis (*M.N.*, lxii. 209), who found a period of 180 years, and recently by Russell (*Publ. Amer. Astr. Soc.*, iii. 328, or *Pop. Ast.*, xxv. 668), who found a period of 690 years. This is one of the binaries for which the observations extend some distance round both sides of the periastron, but for which there is little indication of what the maximum separation and the period may be. It is certain that the period is much longer than that found by Lewis, and, in fact, a parabolic orbit might be found to fit the observations with considerable accuracy.

When first observed by Struve in 1828, the separation was over 1". Thereafter the position angle decreased slowly while the separation steadily decreased till in the eighties the components were too close for observation. When the pair was again observed in 1895 the position angle had changed about 220° from the position in which the companion was last seen. The separation has been steadily increasing and the position angle decreasing since. About 310° of the apparent orbit were described in the 90 years covered by the observations, but it will take several centuries for the completion of the remaining 50°.

The orbit was investigated as follows: The observed angles and distances were plotted against the time and smooth curves drawn to represent the observations as well as possible. The results obtained from these curves, together with the value of $rr'd\theta$ for 10-year intervals, are given below:—

θ	r	$rr'd\theta$	θ	r	$rr'd\theta$
1830	292.4	1.21	1886	241.0	0.22
1840	290.9	1.10	1898	6.5	0.28
1850	288.4	0.98	1903	355.7	0.37
1860	283.8	0.83	1908	348.8	0.47
1870	277.4	0.63	1913	344.35	0.55
1880	265.8	0.40	1918	341.1	0.64
		3.64			

Now, the change in angle at the beginning of the observations is too slow for $rr'd\theta$ to be well determined, and about 1886 the separation is too small. Yet the results are not satisfactory, for when we combine the areas for longer intervals we get:—

θ	r	$rr'd\theta$	θ	r	$rr'd\theta$
1830	292.4	1.21	1898	6.5	0.28
1860	283.8	0.83	1908	348.8	0.47
1880	265.8	0.40	1918	341.1	0.64
		2.88			2.33
		2.99			2.32

It was finally decided to determine the orbit by Thiele's method from the following positions:—

1830	292.4	1.195
1880	265.8	0.380
1918	340.7	0.670

although it was recognised that the resulting orbit would indicate the early observed distances too large and the recent ones too small. Practically no attention was paid to the observations of 1887, 1889, and 1895.

T	1888.10	a 1.00	i 43.6
P	361 years	e 0.9258	Ω 78.4
n	-0.997		ω 59.1

The ephemeris has been constructed for equal intervals of the eccentric anomaly:—

E	θ	r	$rr'd\theta$	E	θ	r	$rr'd\theta$
1827.77	110	293.0	1.158	1888.89	-10	86.5	0.087
1840.21	100	290.2	1.037	1889.96	-20	60.0	0.124
1851.04	90	286.9	0.910	1891.58	-30	39.2	0.170
1860.27	80	283.4	0.778	1894.03	-40	22.1	0.228
1867.89	70	279.3	0.647	1897.49	-50	8.5	0.301
1873.99	60	274.4	0.520	1902.21	-60	357.6	0.391
1878.71	50	268.2	0.400	1908.31	-70	349.0	0.494
1882.17	40	260.2	0.291	1915.93	-80	342.1	0.608
1884.62	30	248.7	0.196	1925.16	-90	336.5	0.731
1886.24	20	229.8	0.118	1935.99	-100	331.8	0.857
1887.31	10	191.5	0.066	1948.43	-110	327.8	0.982
1888.10	0	128.8	0.060	1962.38	-120	324.3	1.103

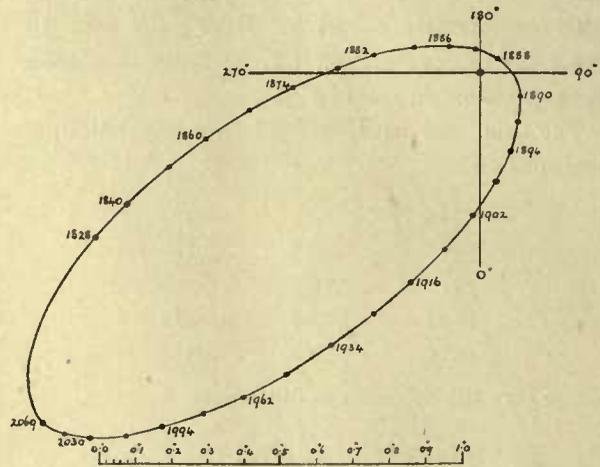
B.D. 26°, 2345.

P.M. 0.022 in 120°.3 (Greenwich, 1910).

Par. Abs. Trig. —".022 (Sproul). Spec. ".013

From the comparison given below, it will be seen that there is a discordance of 50° from the 8 observations of Schiaparelli in 1887. The orbit may be considerably in error at that date, but no orbit could be made to fit the observations of 1880, 1884, and 1887. The present orbit differs widely from Russell's orbit; the difference is probably due to the weights given to the different observations at the critical period. As the change in position angle is now small it is only necessary to observe this pair at long intervals of time, but an accurate measurement of the separation at the present time would serve as a check on the orbit.

Apparent Orbit of Σ 1639.



Comparison of Observations with Ephemeris:—

Observed.	Obs.—Comp.
1828.86	290.0 1.18 Σ 4 -2.8 +.03
1836.49	292.8 1.18 Σ 2 +1.8 +.10
1842.62	290.4 1.11 OΣ 4 +0.9 +.11
1855.32	288.0 0.93 OΣ 1 +2.7 +.08
1856.90	285.8 0.86 Se. 2 +1.1 +.03
1863.16	285.7 0.67 Δ 4 +3.7 -.06
1870.31	279.8 0.73 OΣ 1 +2.2 +.13
1875.39	273.1 0.40 Sp. 4 +0.4 -.08
1875.78	273.3 0.39 Δ 2 +1.1 -.08
1877.38	269.1 0.39 Sp. 4 -1.1 -.05
1877.87	271.0 0.38 Δ 2 +1.4 -.04
1880.35	262.8 0.40 Sp. 4 -2.0 +.05
1882.39	258.1 0.39 Sp. 4 -1.3 +.10
1884.17	245.2 0.37 Sp. 5 -6.2 +.15
1887.39*	235.9 0.22 Sp. 8
1892.36 †	Single, 36-inch β
1895.32	25.4 0.2 ± HΣ 3 +8.7 -.06
1897.02	14.3 0.21 Gr. 3 +4.3 -.08
1897.16	8.6 0.27 A. 3 -1.0 -.03
1898.31	4.7 0.33 A. 3 -1.7 +.01
1899.07	5.4 0.22 Gr. 4 +1.0 -.11
1899.40	3.3 0.29 A. 3 -0.1 -.05
1901.26	355.7 0.33 A. 3 -3.7 -.04
1901.4	358.5 0.26 Gr. 12 -0.4 -.11
1903.41	352.9 0.38 A. 3 -2.7 -.03
1903.84	354.1 0.40 Bies. 6 -0.8 -.01
1904.0	356.9 0.34 Gr. 7 +2.2 -.08
1905.15	353.8 0.47 A. 2 +0.5 +.03
1908.5	348.2 0.42 Gr. 16 -0.6 -.08
1911.39	345.6 0.55 A. 2 -0.4 .00
1913.2	344.1 0.49 Gr. 21 -0.3 -.08
1914.10	347.7 0.74 Bies. 4 +4.2 +.16
1915.39	341.6 0.51 J 2 -0.8 -.09
1915.94	347.3 0.77 Dob. 2 +5.2 +.16
1917.37	340.7 0.54 J 2 -0.4 -.09
1917.86	343.8 0.60 Lv. 2 +3.1 -.03
1919.4	339.9 0.59 Gr. 2 +0.2 -.07
1920.30	347.0 .. Dob. 1 +7.9 ..

* Computed position, 187°.2, 0".06.

† Computed separation, 0".19.

6566.

Σ 1768.

B.D. 37°, 2433.

R.A. 13^h 34^m 8^s.
Dec. +36° 40'.

Mags. 5.7, 7.6.
Spec. Fo.

P.M. ".104 in 277°.7 (Boss).

Doberek in 1880 obtained for this binary a period of 119 years, but in a new determination in 1910 he increased the period to 553 years. The orbits computed by See and Lewis have periods of 184 and 220 years respectively. There must for long be considerable uncertainty in the period, for although 315° of position angle have been described since the time of Struve, the apparent orbit is very eccentric and the maximum elongation has yet to be observed. The separation steadily decreased from 1".2 in 1830 to 0".3 in 1858. From the latter date till 1872 the star appeared single in the Pulkowa refractor. The computed separation for 1876, when the star was again reobserved as double, is 0".6, and it is now greater than it was in 1830. The eccentricity of the orbit is large and as given below should be fairly accurate. Although the period is still very uncertain, the other elements should not be seriously in error. The apparent orbit has been deduced from the following positions:—

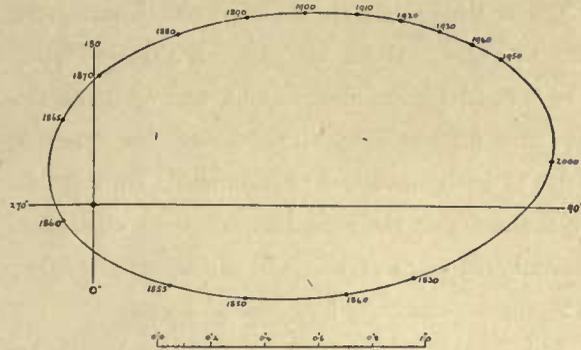
1832	76.4	1.190
1856	38.0	0.347
..	283.1	0.133
1876	162.1	0.618
1904	129.6	1.141

The resulting elements are:—

T 1860.26	a 1.205	i 47.4
P 220.4 years	e 0.8562	Ω 52.8
n -1.6335		ω 241.4

	Ephemeris.	
1830	77.5	1.228
1835	74.5	1.123
1840	70.8	1.000
1845	66.0	0.851
1850	58.7	0.664
1855	44.1	0.413
1860	297.3	0.125
1865	200.5	0.337
1870	178.1	0.482
1875	163.9	0.601
1880	154.2	0.709
1885	147.0	0.808
1890	141.3	0.903
1900	132.7	1.062
1910	126.4	1.218
1920	121.4	1.343
1930	117.1	1.450
1940	113.4	1.539
1950	110.1	1.612
2000	88.9	1.713

Apparent Orbit of Σ 1768.



Comparison of Observations with Ephemeris:—

	Observed.			Obs.—Comp.	
1831.51	76.0	1.07	Σ 10	-0.6	-1.3
1841.17	72.6	1.01	OΣ 4	+2.8	+0.4
1846.80	67.8	0.72	OΣ 3	+4.0	-0.7
1849.77	65.6	0.65	OΣ 3	+6.5	-0.2
1851.28	56.5	0.39	Ma 4	+0.8	-2.1
1854.78	46.2	0.35±	Ma 2	+1.2	-0.8
1858.65	26.7	0.2±	Ma 2	+26.7	+0.5
1876.45	161.4	0.4±	Sp. 4	+0.5	-2.3
1877.39	154.5	0.4±	Sp. 10	-4.2	-2.5
1878.41	151.8	0.75	Δ 4	-5.2	+0.8
1879.49	157.5	0.51	Hl. 5	+2.6	-1.8
1880.46	155.0	0.60	β 2	+1.6	-1.1
1881.43	155.9	0.41	β 3	+4.1	-3.2
1882.43	152.7	0.45	Hl. 3	+2.0	-3.1
1883.46	149.0	0.7±	Sp. 5	-0.2	-0.8
1884.42	145.5	0.63	Hl. 3	-2.5	-1.6
1885.32	148.2	0.8±	Sp. 9	+1.6	-0.1
1886.45	145.2	0.78	Hl. 4	-0.1	-0.5
1887.41	142.7	0.72	Sp. 9	-1.5	-1.3
1888.44	145.8	0.73	Hl. 3	+2.6	-1.4
1892.17	137.5	0.98	β 3	-1.6	+0.4
1895.18	132.5	1.18	Bar. 8	-3.9	+2.0
1898.13	135.3	1.16	A. 3	+1.3	+1.3
1898.5	134.1	0.96	Gr. 11	+0.4	-0.7
1899.21	132.0	1.18	A. 3	-1.3	+1.3
1902.1	130.6	1.11	Gr. 13	-0.6	+0.2
1902.32	132.7	1.08	A. 2	+1.6	-0.2
1908.49	128.4	1.18	Fox 4	+1.1	-0.1
1910.08	127.8	1.12	Bies. 12	+1.5	-1.0
1913.3	123.2	1.34	Gr. 11	-1.3	+0.8
1917.40	123.9	1.23	J 2	+1.5	-0.9
1918.25	122.8	1.28	Dob. 3	+0.7	-0.4
1919.32	118.8	1.31	Dob. 4	-2.8	-0.2

The distances do not agree well.

6999.

Σ 1879.

B.D. 10°, 2739.

R.A. 14^h 42^m 36^s.
Dec. +9° 58'.

Mags. 7·8, 8·8.
Spec. F8.

P.M. ".272 in 165°·2 (Porter).
Spec. Par. ".035.

Although 310° of the apparent orbit have been described since the first observations, there remains considerable uncertainty in the orbit elements. The separation was over 1" at the time of Struve's observations, after which it steadily decreased. For 25 years after Maedler's observation in 1851 the star appeared single, as the observations of 1865, 1867 cannot be fitted into any orbit. In 1877 the star was observed as double by Burnham, Schiaparelli, and Dembowski. The separation at that date was about 0".4, and it has since increased to 0".8. During the 25 years for which there are no observations over 180° of position angle were described, and this, together with the fact that the apastron is wholly unobserved, accounts for the uncertainty in the orbit elements.

Orbits with periods of 146·9 and 155·0 years were computed by Lewis (*M.N.*, lvi. 33, and *Mem. R.A.S.*, lvi. 396). The orbit given by Van Biesbroeck (*Ann. de l'Obs. Roy. de Belgique*, ix. 118) has a period of 238 years. Recently the orbit has been investigated by Comstock (*A.J.*, 734), who found an orbit with a period of 240 years, but with the other elements considerably different from Van Biesbroeck. A new orbit has been deduced geometrically and is compared with Van Biesbroeck's below :—

Van Biesbroeck.	Greenwich.	Van Biesbroeck.	Greenwich.
T 1868·3	1868·14	e 0·70	0·623
P 238 yrs.	177·9 yrs.	i 57°·6	51°·2
n -1°·511	-2°·023	Ω 74·1	70·6
a 1"·06	0"·789	ω 208·6	211·7

The following table gives the computed positions for a few dates :—

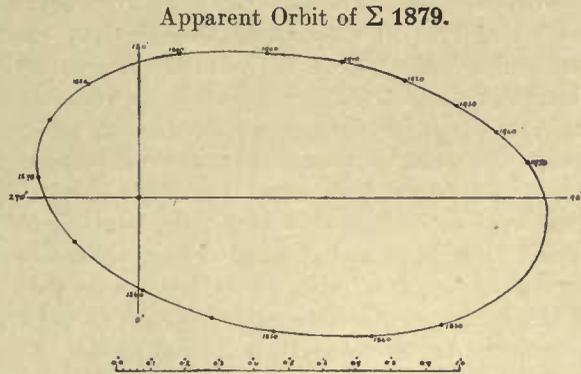
	Van Biesbroeck.		Greenwich.	
1829·99	67·7	1"·14	67·3	0"·96
1851·41	47·5	0·57	42·3	0·50
1877·78	218·1	0·36	214·8	0·35
1889·78	164·8	0·43	164·8	0·44
1902·90	133·6	0·65	133·6	0·60
1920·00	115·6	0·95	113·7	0·85

So far as the angles are concerned, the only differences are to be tested by the single observation of Maedler in 1851 and the rather discordant observations of 1877 and 1878. For 1883 the Greenwich orbit leaves a residual of 10° on the mean of 6 observations by Schiaparelli, while Van Biesbroeck's orbit leaves a still greater residual.

With regard to the distances, Van Biesbroeck's orbit gives a better fit with the early measures while the Greenwich orbit gives a better fit with recent measures.

The following ephemeris is based on the Greenwich elements :—

1830	67·3	0"·959	1885	182·1	0"·390
1835	63·7	0·880	1890	164·0	0·438
1840	59·3	0·788	1895	149·8	0·494
1845	53·5	0·678	1900	138·5	0·563
1850	45·3	0·550	1905	130·5	0·642
1855	31·5	0·406	1910	123·8	0·715
1860	2·5	0·266	1915	118·3	0·785
1865	304·1	0·225	1920	113·7	0·849
1870	257·8	0·301	1930	106·1	0·967
1875	228·8	0·345	1940	100·2	1·062
1880	204·2	0·363	1950	95·1	1·133



Comparison of Observations with Ephemeris :—

	Observed.			Obs.—Comp.		
1829·99	67·3	1"·18	Σ 3	0·0	+·22	
1842·42	59·2	0·79	Ma 3	+ 2·6	+·05	
1843·37	57·2	0·69	Ma 1	+ 1·6	-·03	
1844·35	54·0	0·6±	Ma 1	- 0·4	-·09	
1851·41	43·5	0·45	Ma 1	+ 1·2	-·05	
1877·43	219·1	0·37	Sp. 3	+ 2·6	+·01	
1878·39	206·6	0·38	Δ 2	- 5·3	+·02	
1878·44	217·1	0·42	β 1	+ 5·5	+·06	
1882·50	183·5	0·35	Sp. 3	- 9·4	-·02	
1883·47	177·9	0·38	Sp. 6	-10·7	·00	
1884·50	187·3	0·37	Sp. 2	+ 3·0	-·02	
1885·48	179·5	0·41	Sp. 4	- 0·8	+·02	
1886·51	174·2	0·50	Sp. 4	- 1·9	+·10	
1887·44	173·1	0·38	Hl. 3	+ 0·3	-·03	
1887·49	173·1	0·35	Sp. 4	+ 0·6	-·06	
1889·78	163·2	0·37	HΣ 3	- 1·6	-·07	
1896·42	150·7	0·47	Com. 1	+ 4·6	-·04	
1896·6	142·9	0·45	Gr. 9	- 2·8	-·07	
1897·54	147·8	0·42	Brown 3	+ 4·2	-·11	
1898·17	145·8	0·69	A. 3	+ 3·4	+·15	
1898·8	138·9	0·47	Gr. 8	- 2·0	-·07	
1900·40	136·4	0·64	Doo. 3	- 1·3	+·07	
1902·6	132·7	0·51	Gr. 7	- 1·4	-·09	
1903·48	137·0	0·57	Bies. 2	+ 4·3	-·05	
1905·41	131·2	0·60	A. 2	+ 1·3	-·05	
1909·43	131·4	0·68	J 3	+ 6·8	-·03	
1909·9	121·9	0·57	Gr. 7	- 2·0	-·15	
1912·1	121·1	0·71	Gr. 7	- 0·3	-·04	
1912·21	123·9	0·72	A. 1	+ 2·6	-·03	
1914·4	117·0	0·73	Gr. 8	- 1·8	-·05	
1917·44	116·5	0·76	J 2	+ 0·6	-·05	
1919·4	114·6	0·85	Gr. 4	+ 0·4	+·01	

7001.

OΣ 285.

B.D. 42,° 2531.

R.A. 14^h 42^m 40^s.

Mags. 7.1, 7.6.

P.M. ".048 in 170° 5 (Greenwich).

Dec. +42° 41'.

Spec. F5.

Par. Abs. Trig. — ".022 (Sproul). Spec. ".012.

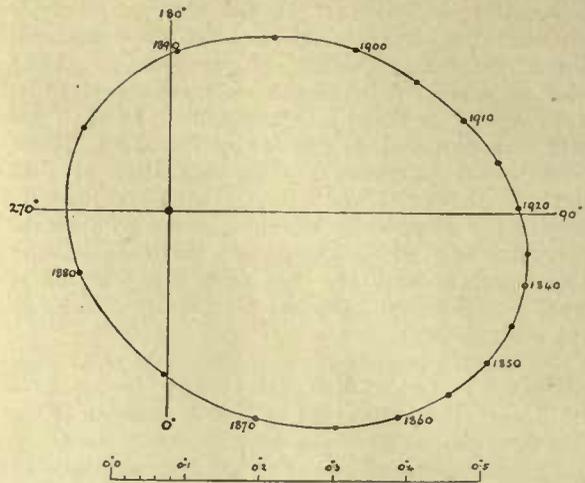
This double star has described the greater part of a revolution since 1843, when it was first measured. The observations of Maedler and Otto Struve cover the period 1843 to 1855, when the separation was just under half a second. The corrections to his observations found by Otto Struve have been applied, and this makes the early observations in fair agreement. Between 1855 and 1885 the observations were rather few and uncertain, but single observations were secured in 1865 by Dembowski and in 1876 by Burnham, and these have been utilised in drawing the apparent orbit. No attempt was made to satisfy the observations of Engelmann in 1883, but the mean of his six angles is satisfied to 16°. As this is about the motion in 1 year at that epoch and as the separate measures show a range of 40°, the agreement is considered to be sufficiently close. All the observations after 1883 are well represented. The arc covered by the observations from 1843 to 1917 is nearly 340°, so that the elements must be fairly accurate. The uncertainty is mostly due to personality in the observations, for at the time of the early observations the motion in angle was only 1°.4 a year while the correction applied to Otto Struve's observations is about 9°. The orbit has been obtained by Zwiers' method, the areas being adjusted by a planimeter. Orbits of this pair have been computed in the past by Burnham, Gore, See, and Van Biesbroeck, who obtained periods of 62.1, 118.57, 76.67, 97.93 years respectively.

T 1882.64	a 0.33	i 25.6
P 88.5 years	e 0.553	Ω 41.7
n -4°.067		ω 222.3

Ephemeris.

1840	78.8	0.492
1845	72.0	0.490
1850	65.1	0.478
1855	57.2	0.455
1860	48.6	0.419
1865	38.0	0.370
1870	23.2	0.304
1875	358.7	0.222
1880	305.2	0.146
1885	226.0	0.159
1890	177.2	0.217
1895	149.4	0.276
1900	131.2	0.332
1905	118.0	0.379
1910	107.5	0.419
1915	98.7	0.450
1920	90.9	0.473
1925	83.7	0.488
1930	76.8	0.493

Apparent Orbit of OΣ 285



Comparison of Observations with Ephemeris:—

	Observed.	Obs.—Comp.
1843.32	72.6 0.45 Ma 2	- 1.7 -.04
1845.80	72.2 0.61 OΣ 3	+ 1.3 +.12
1847.96	72.2 0.42 Ma 3	+ 4.2 -.07
1852.69	60.6 0.45 Ma 1	- 0.2 -.02
1852.74	57.8 0.50 OΣ 4	- 2.9 +.03
1855.84	53.9 0.51 OΣ 3	- 1.9 +.06
1865.53	36.5 .. Δ 1	- 0.2 ..
1876.40	350± 0.3 β 1	+ 3 +.10
1883.84	258.3 0.22 En. 5	+ 16 +.07
1885.40	255 .. Per. 3	- 3 ..
1887.60	202.2 0.24 Sp. 4	+ 0.4 +.06
1891.30	168.7 0.24 β 3	+ 0.7 .00
1892.30	162.2 0.21 β 3	- 0.3 -.03
1893.45	156.0 0.24 β 1	- 0.2 -.02
1895.54	141.1 0.25 Com. 3	- 6.4 -.03
1896.43	144.3 0.3 Com. 2	+ 0.4 +.01
1897.22	141.1 0.33 A. 3	- 0.1 +.03
1897.32	146.9 0.41 Gr. 2	+ 6.0 +.11
1898.32	137.2 0.38 Hu. 3	0.0 +.07
1898.38	136.7 0.28 Doo. 2	- 0.3 -.03
1899.12	134.5 0.39 Gr. 4	+ 0.6 +.07
1899.38	136.1 0.34 A. 3	+ 3.0 +.01
1899.69	134.3 0.36 Hu. 3	+ 2.1 +.03
1900.99	125.5 0.30 Gr. 8	- 2.6 -.04
1903.39	125.9 0.37 Bies. 4	+ 3.9 +.01
1903.40	124.9 0.30 Gr. 7	+ 2.9 -.06
1906.27	115.2 0.34 A. 1	- 0.2 -.05
1907.26	113.7 0.32 Gr. 5	+ 0.4 -.08
1909.44	113.5 0.38 J 3	+ 4.8 -.03
1911.52	103.0 0.43 A. 2	- 1.6 .00
1911.56	105.5 0.36 Gr. 7	+ 0.9 -.07
1914.79	100.8 0.36 Gr. 6	+ 1.8 -.09
1917.55	94.0 0.40 J 2	- 0.7 -.06
1918.41	96.5 0.44 Dob. 4	+ 3.2 -.03
1919.62	91.4 0.28 Gr. 1	- 0.1 -.19

7259.

Σ 1938.

B.D. 37°, 2636.

R.A. 15^h 21^m 42^s. Mags. 6.7, 7.3.
Dec. +37° 36'. Spec. Ko.

P.M. ".172 in 302°.7 (Boss).
Par. Abs. Trig. ".046 (3). Spec. ".032.

Many orbits of μ² Bootis have been computed. Since Struve's observations, as much as 280° of the apparent orbit have been described, but this has been more or less symmetrically disposed about periastron and represents only about one-third of the period. The elements given below were deduced with the help of the Herschel observations of 1782 and 1802, on the accuracy of which they largely depend. The apparent orbit was determined analytically from the five positions:—

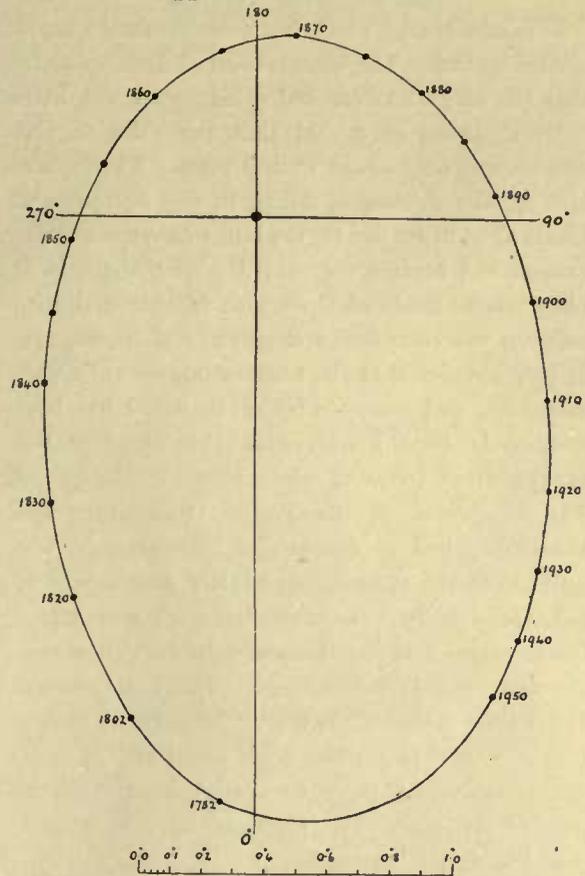
1782.6	356.8	1.850
1835.0	318.1	1.000
1855.0	248.6	0.510
1885.0	111.8	0.697
1915.0	52.4	1.197

The resulting elements are:—

T 1865.04	a 1.271	i 40.9
P 234.8 years	e 0.560	Ω 174.5
n -1°.533		ω 22.1

Ephemeris.

1782.7	356.8	1.851
1802.9	346.2	1.632
1820	334.7	1.345
1825	330.0	1.236
1830	324.4	1.117
1835	317.4	0.988
1840	308.2	0.852
1845	295.5	0.717
1850	277.2	0.594
1855	251.4	0.513
1860	220.6	0.501
1865	191.8	0.541
1870	167.5	0.587
1875	146.2	0.621
1880	127.2	0.655
1885	110.2	0.702
1890	95.8	0.765
1895	83.7	0.841
1900	73.7	0.926
1905	65.4	1.015
1910	58.5	1.104
1915	52.6	1.194
1920	47.6	1.278
1925	43.1	1.362
1930	39.2	1.440
1935	35.6	1.512
1940	32.4	1.580
1945	29.4	1.643
1950	26.6	1.700



Comparison of Observations with Ephemeris:—

Observed.		Obs.—Comp.	
1782.68	357.2 ..	H.	1 +0.4 ..
1802.86	346.2 ..	H.	1 0.0 ..
1826.77	327.0 1.38	Σ	2 -1.0 +1.9
1829.73	324.0 1.24	Σ	2 -0.7 +1.2
1833.85	319.7 1.19	Σ	3 +0.6 +1.7
1835.55	318.6 1.10	Σ	3 +2.1 +1.3
1836.65	315.1 1.06	Σ	3 +0.4 +1.1
1840.46	313.8 0.98	OΣ	3 +6.4 +1.4
1842.23	303.5 0.85	OΣ	3 +0.4 +0.6
1846.68	287.1 0.57	OΣ	4 -2.4 -1.1
1850.46	272.7 0.53	OΣ	2 -2.3 -0.5
1855.11	247.2 0.53	OΣ	4 -3.6 +0.2
1857.65	237.9 0.58	OΣ	3 +2.0 +0.8
1858.56	228.3 0.57	OΣ	3 -0.9 +0.7
1860.95	211.3 0.58	OΣ	3 -3.6 +0.8
1866.40	179.2 0.60	OΣ	3 -4.6 +0.5
1869.54	167.5 0.54	OΣ	2 -2.1 -0.4
1873.09	158.2 0.63	OΣ	4 +4.2 +0.2
1875.41	141.9 0.69	Δ	8 -2.3 +0.7
1878.52	132.0 0.62	Δ	6 -0.5 -0.2
1881.50	121.9 0.62	Hl.	3 0.0 -0.5
1882.60	116.5 0.67	OΣ	3 -1.5 -0.1
1884.47	113.8 0.69	Hl.	3 +1.8 -0.1
1887.55	106.4 0.91	HΣ	3 +3.4 +1.8
1888.44	100.2 0.60	Hl.	4 +0.5 -1.4
1892.58	89.1 0.69	Com.	4 -0.1 -1.1
1893.50	82.9 1.26	Gr.	1 -4.0 +4.4
1897.86	76.9 0.83	A.	3 -0.9 -0.6
1898.49	77.4 0.93	Gr.	7 +1.0 +0.3
1899.21	74.7 0.87	A.	3 -0.5 -0.4
1901.63	72.7 0.98	Gr.	10 +1.9 +0.3
1903.42	68.6 1.00	A.	2 +0.6 +0.1
1904.54	66.8 1.10	Gr.	7 +0.5 +0.9
1905.49	63.4 0.98	β	1 -1.7 -0.4
1906.22	62.1 1.02	A.	2 -1.5 -0.2
1908.97	58.7 1.06	J	6 -1.2 -0.2
1911.10	59.4 1.15	Gr.	4 +2.4 +0.3
1912.58	54.5 1.02	A.	2 -0.8 -1.3
1914.23	54.2 1.25	Gr.	5 +0.8 +0.7
1916.25	52.3 1.24	Hertz.	+1.0 +0.3
1917.52	49.9 1.23	J	3 -0.1 -0.1
1919.38	49.7 1.30	Hertz.	+1.5 +0.3

7642.

Σ 2052.

B.D. 18°, 3182.

R.A. 16^h 25^m 36^s. Mags. 7.5, 7.5.
Dec. +18° 34'. Spec. G5.

P.M. ".508 in 320°·1 (Porter).
Par. Abs. Trig. ".088 (Yale). Spec. ".058.

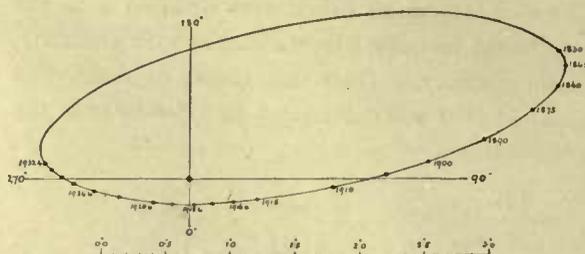
This is a binary which has recently shown rapid orbital motion. The observations of distance show that the separation reached a maximum of a little over 3" about 1840. At that time the angular motion was only about 1° in 6 years. The separation rapidly decreased, falling to 1".5 in 1905 and about 0".35 in 1916. By the latter date the angular motion had become very rapid. With the help of observations made at Greenwich in 1917 and 1919 an orbit was computed and given in *M.N.*, 80, 741. It now appears that the observations of 1919 were erroneous, and a new orbit given below has been computed. For this orbit reliance has been placed in the excellent series of observations made by Mr Van Biesbroeck of the Yerkes Observatory and kindly supplied in manuscript. No attempt was made to fit the observations exactly, as it should be possible to improve the orbit after a few more years. Observations made at Greenwich in 1921 show that the new orbit is substantially correct at present. It will be seen that the new orbit indicates an elongation of over 1" in position angle about 260° in 1935. The companion is therefore nearly past the critical part of its orbit. The elements have been computed by Zwiers' method.

T	1920.21	a 2".87	i 75°.0	} 1900
P	317.5	e 0.77	Ω 93°.1	
n	-1°.134		ω 245°.5	

Ephemeris (Equinox of Date).

1830	109.6	3".024
1845	107.0	3".047
1860	104.4	2".945
1875	101.4	2".714
1890	97.7	2".294
1900	94.0	1".832
1905	91.3	1".512
1910	86.6	1".094
1915	73.9	0".540
1916.4	63.1	0".366
1917.4	45.9	0".250
1918.4	9.3	0".180
1919.4	325.3	0".214
1920.4	301.9	0".320
1922.4	284.5	0".557
1924.4	277.2	0".750
1926.4	272.7	0".895
1928.4	269.2	0".997
1930.4	266.3	1".068
1932.4	263.7	1".116

Apparent Orbit of Σ 2052.



Comparison of Observations with Ephemeris:—

Observed.		Obs.—Comp.	
1829.52	109.7 2".98 Σ	3	0.0 -".04
1842.44	109.8 2.40 Ma	1	+2.3 -".65
1851.89	108.0 3.05 Σ	1	+2.1 +".04
1856.49	104.1 2.95 Se	2	-1.3 -".03
1858.44	104.8 2.62 Wr.	3	+0.1 -".34
1865.55	103.2 2.99 Se	3	-0.2 +".11
1866.49	103.1 2.75 Δ	4	-0.1 -".11
1876.31	101.0 2.61 Sp.	5	-0.2 -".08
1879.56	101.6 2.70 Hl.	3	+1.2 +".08
1884.48	99.2 2.47 Hl.	3	+0.1 -".01
1890.42	98.5 2.29 Gla.	2	+0.9 +".01
1897.91	94.7 1.89 Gr.	10	-0.2 -".03
1903.39	92.0 1.56 Gr.	19	-0.4 -".05
1903.40	91.4 1.55 Do.	3	-1.0 -".06
1908.56	88.7 1.43 J	3	+0.4 +".21
1909.38	86.4 1.09 A.	1	-0.9 -".06
1909.41	86.2 1.08 J	3	-1.1 -".07
1909.45	84.1 1.37 Doo	3	-3.1 +".22
1910.46	84.4 0.98 Fox	3	-1.4 -".07
1911.42	84.1 1.04 A.	1	0.0 +".09
1911.43	83.1 1.10 Voûte	6	-1.0 +".15
1912.45	80.9 1.00 Voûte	4	-0.8 +".17
1913.08	79.8 0.78 Gr.	11	-0.5 +".01
1913.46	79.3 0.80 Bies.	3	+0.2 +".07
1914.46	76.4 0.64 Bies.	3	+0.4 +".03
1915.46	70.9 0.46 Bies.	1	-0.4 -".02
1916.25	62.4 0.56 Bies.	4	-2.4 +".18
1917.44	47.0 0.27 J	2	+3.7 +".02
1918.40	7.5 0.28 Bies.	4	-1.8 +".10
1919.31	331.3 0.28 Bies.	4	+2.8 +".07
1920.34	307.8 0.28 Bies.	4	+5.0 -".04
1921.46	289.4 0.28 Gr.	4	-1.0 -".16

7649.

Σ 2055.

B.D. 2°, 3118.

R.A. 16^h 27^m 8^s.

Mags. 4.0, 6.1.

P.M. ".097 in 209°.7 (Boss).

Dec. +2° 8'.

Spec. Ao.

Par. Abs. Trig. ".008 (4).

Between 1825 and 1919 the change in position angle has amounted to 110°, roughly equally distributed about the position of maximum separation. Although the period is only 110 years, no good orbit has yet been obtained from observations beginning with Struve. There are two recorded observations made by Herschel in 1783 and 1802. With the aid of these observations computers, beginning with Struve himself, have worked on this system. The position angles given by Herschel on the above dates are 75°.5 and 69°.3. The motion, however, is direct, and on account of the great difference in the magnitudes of the components there is no reason to assume a correction of 180°. Herschel recorded his observations for the star as 14°.5 *nf* and 20°.7 *nf*, and it has generally been assumed that the letters describing the quadrant in one or both observations have been erroneously recorded. Glasenapp (*M.N.*, 48, 254) actually discussed all the 16 possible combinations of the letters and deduced a period of 373 years. Lewis (*Memoirs R.A.S.*, 56, 454), adhering to the first measurement and changing the second to 110°.7, has obtained a period of 134 years. Lohse (*Potsdam Publ.*, 20, 128), discarding Herschel's observations altogether, reduced the period to 123 years. The difficulty is solved in Herschel's *Collected Works*, 1, 180, footnote, where we read, relative to the observation of 1783: "The measure was forgot to be wrote down but it being the last taken I find my micrometer stands at 14° 30' which agrees well enough with the figure, but as the instrument has been touched a good deal it may have been altered." In the orbit given below the 1802 observation is satisfied to 0°.9. The position angle in 1783 is 48°.0 and the distance 1".44, showing that Herschel recorded the quadrant correctly and that the separation of the components was such as to make the discovery easy. An approximate orbit computed with modern observations only, shows that it would have been difficult for Herschel to have discovered the companion in any but the first quadrant.

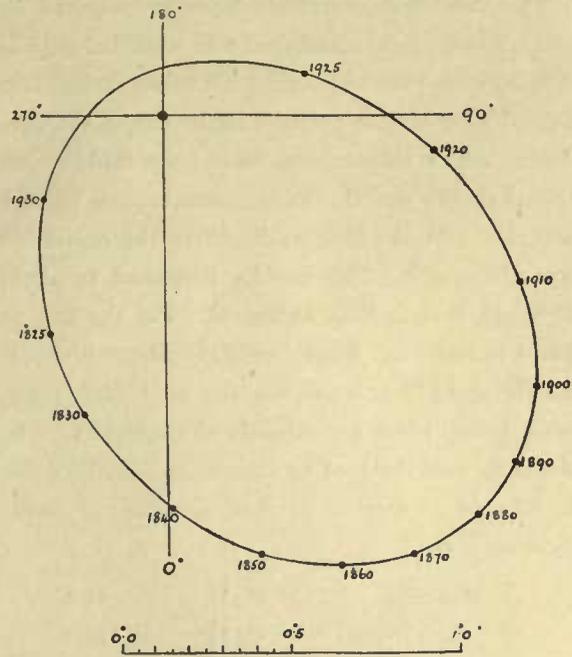
The values of P, T, Ω, ω given below must be nearly correct, but the elements a, e, i are closely connected with the nearness of approach of the two stars. In the next 20 years the companion should describe the 240° of the apparent orbit still unobserved and return to the Struve position of 1830. Observations of this binary should be carefully made in that interval.

T 1927.4	a 1.328	i 53°.2
P 110.3 years	e 0.86	Ω 110.0
n +3°.264		ω 96.7

Ephemeris.

1783.2	48°.0	1.436	1890	45°.1	1.462
1802.4	68.4	1.096	1900	53.8	1.363
1825	331.5	0.741	1905	58.8	1.280
1830	344.2	0.918	1910	64.7	1.170
1840	0.5	1.160	1915	72.0	1.023
1850	11.9	1.326	1920	82.4	0.809
1860	21.1	1.425	1925	105.5	0.437
1870	29.3	1.494	1930	304.2	0.433
1880	37.1	1.501	1935	330.4	0.728

Apparent Orbit of Σ 2055.



Comparison of Observations with Ephemeris:—

	Observed.				Obs.—Comp.
1783.18	(75.5)	..	H.	1	..
1802.39	69.3	..	H.	1	+0.9
1825.51	331.8	0.84	Σ	3	-1.2
1828.51	342.1	0.81	Σ	3	+1.1
1831.90	349.5	1.04	Σ	2	+1.7
1834.42	350.6	0.99	Σ	2	-1.7
1835.55	352.5	0.99	Σ	5	-1.6
1836.50	353.4	1.01	Σ	5	-1.9
1837.59	356.8	1.03	Σ	1	-1.4
1841.09	3.8	0.99	OΣ	8	+1.9
1846.52	8.9	1.07	OΣ	7	+0.6
1853.22	11.8	1.27	OΣ	3	-3.2
1858.59	18.1	1.36	OΣ	4	-1.9
1862.93	19.6	1.44	Δ	12	-3.8
1865.95	25.7	1.51	Δ	13	-0.2
1867.98	26.9	1.50	Δ	10	-0.8
1870.00	28.0	1.55	Δ	8	-1.3
1871.89	29.4	1.60	Δ	9	-1.5
1874.08	31.5	1.63	Δ	7	-1.0
1876.03	35.1	1.60	Δ	9	+1.1
1878.04	36.1	1.60	Δ	12	+0.6
1879.57	35.0	1.44	Hl.	4	-1.8
1880.46	37.7	1.45	β	4	+0.3
1881.54	37.7	1.44	Hl.	4	-0.7
1882.51	38.9	1.48	Hl.	4	-0.2
1883.58	38.5	1.57	Hl.	5	-1.5
1884.48	43.3	1.51	Hl.	3	+2.9
1885.49	44.1	1.48	Hl.	4	+2.6
1886.53	41.7	1.39	Hl.	5	-0.7
1887.48	45.5	1.40	Hl.	4	+2.3
1888.48	46.0	1.37	Hl.	7	+2.1
1891.51	47.6	1.39	Hl.	5	+1.3
1896.54	50.7	1.79	Hu.	3	+0.1
1897.22	48.6	1.31	Gr.	7	-2.6
1902.39	56.6	1.35	A.	3	+0.3
1903.06	58.2	1.27	Gr.	9	+1.4
1905.34	59.8	1.25	β	3	+0.5
1907.14	62.4	1.24	Gr.	11	+1.1
1909.86	66.1	0.99	J	5	+1.5
1911.52	67.8	1.14	A.	2	+1.0
1913.13	71.9	1.06	Gr.	9	+2.8
1913.43	70.9	1.08	Bies.	3	+1.3
1914.46	73.2	0.77	Bies.	3	+2.1
1914.47	71.7	1.06	Dob.	3	+0.6
1915.46	76.2	0.86	Bies.	1	+3.5
1916.48	76.4	1.05	Dob.	3	+1.9
1917.16	76.0	0.92	J	3	-0.6
1917.52	79.5	1.07	Dob.	3	+2.8
1918.48	80.4	0.79	Dob.	3	+1.7
1919.45	80.1	0.93	Dob.	2	-1.1
1919.45	85.4	0.90	Gr.	2	+4.2

7748.

Δ 15.

B.D. 43°, 2639.

R.A. 16^h 41^m 37^s. Mags. 8.0, 8.2.
Dec. +43° 37'. Spec. K5.

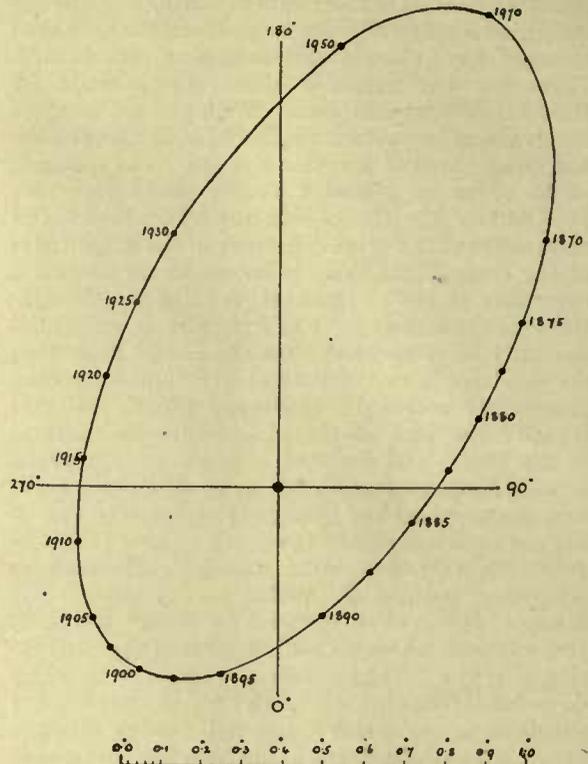
This orbit has previously been investigated by Gore, Evans, Lewis, and See, who obtained periods ranging from 70 to 205 years. The observations now extend over 240° of position angle, but as the time during which observations have been made is less than half the period, the elements cannot be very accurate. At the time of discovery the separation was about 0".9. This rapidly decreased to about 0".3 and then slightly increased. For the last 20 years it has been nearly constant about 0".5. It should steadily increase for the next fifty years, when it will reach a maximum of about 1".3. The elements were deduced by Glasenapp's modification of Kowalsky's method (cf. See, *Evolution of Stellar Systems*, i. 49).

T 1894.52 a 0".935 i 59.3
P 126.1 years e 0.435 Ω 147.1
n -2° 855 ω 213.0

Ephemeris.

1867.5	135.9	0".966
1870.0	132.6	0.893
1872.5	128.6	0.810
1875.0	123.7	0.720
1877.5	117.3	0.622
1880.0	108.5	0.521
1882.5	95.4	0.422
1885.0	75.3	0.343
1887.5	47.2	0.309
1890.0	18.9	0.337
1892.5	357.7	0.406
1895.0	343.0	0.480
1897.5	331.9	0.537
1900.0	322.6	0.567
1902.5	313.8	0.574
1905.0	305.0	0.562
1907.5	295.6	0.541
1910.0	285.3	0.517
1912.5	274.1	0.497
1915.0	262.2	0.486
1917.5	250.0	0.489
1920.0	238.3	0.506
1922.5	227.6	0.533
1925.0	218.2	0.573
1927.5	210.1	0.619
1930.0	203.2	0.671
1950.0	172.2	1.081
1970.0	156.1	1.261

Apparent Orbit of Δ 15



Comparison of Observations with Ephemeris :—

	Observed.			Obs.—Comp.
1869.74	132.7	0".91	Δ	3 - 0.2 + 0.1
1871.49	130.0	0.96	Δ	2 - 0.3 + 0.12
1875.52	123.9	0.70	OΣ	1 + 1.5 0.00
1877.00	116.8	0.66	Δ	4 - 1.8 + 0.02
1878.17	112.1	0.48±	Sp.	3 - 3.2 - 0.12
1881.42	104.9	0.46	β	3 + 3.2 0.00
1882.47	99.9	0.42±	Sp.	3 + 4.4 0.00
1883.23	101.8	0.53	En.	6 + 11.5 + 0.13
1883.73	88.8	0.42	Sp.	6 + 2.3 + 0.04
1886.67	55.8	0.35±	Sp.	2 - 1.3 + 0.04
1887.56	45.3	0.30±	Sp.	4 - 1.2 - 0.01
1892.56	355.8	0.40	Com.	3 - 1.5 - 0.01
1893.54	347.6	0.44	Lv.	2 - 3.4 0.00
1894.53	347.4	0.49	Wilson	2 + 2.0 + 0.02
1895.26	339.6	0.59	Bar.	3 - 2.1 + 0.10
1895.54	341.1	0.43	Com.	3 + 0.9 - 0.06
1896.40	336.8	0.58	Lv.	2 + 0.3 + 0.08
1897.36	329.4	0.50	A.	3 - 3.1 - 0.03
1898.75	326.8	0.44	Gr.	5 - 0.3 - 0.12
1899.31	326.9	0.62	A.	4 + 1.8 + 0.06
1901.15	317.4	0.51	Gr.	6 - 1.2 - 0.06
1903.53	312.1	0.50	A.	3 + 1.9 - 0.07
1903.74	307.5	0.54	Gr.	5 - 1.9 - 0.03
1906.22	301.1	0.52	A.	2 + 0.7 - 0.03
1907.85	294.2	0.52	Gr.	5 0.0 - 0.02
1909.42	289.5	0.35	J	3 + 1.7 - 0.17
1911.53	274.9	0.48	A.	1 - 3.5 - 0.03
1911.95	276.4	0.42	Gr.	4 - 0.2 - 0.08
1912.58	269.5	0.42	A.	2 - 4.2 - 0.08
1917.75	252.1	0.41	J	2 + 3.2 - 0.08
1919.60	236.2	0.32	Gr.	1 - 4.0 - 0.18

7783.

Σ 2107.

B.D. 28°, 2624.

R.A. 16^h 48^m 52^s.
Dec. +28° 47'.

Mags. 6.5, 8.0.
Spec. F5.

P.M. ".029 in 33° 3 (Greenwich, 1910).
Par. Abs. Trig. ".024 (3). Spec. ".022.

The orbit of this binary has been investigated by Casey, Berberich, Lewis, Lohse, and Rabe. The uncertainties in the elements should soon be removed, as the observations extend over 240° in position angle and through more than half of the period. The early observations just cover the maximum separation of 1".0, while a minimum separation of 0".4 took place in 1896. The separation is now about 0".6 and steadily increasing towards the maximum. The apparent orbit was deduced analytically from the positions:—

1830	149.8	1.02
1860	182.9	0.91
1880	221.4	0.61
1895	289.2	0.42
1910	9.8	0.54

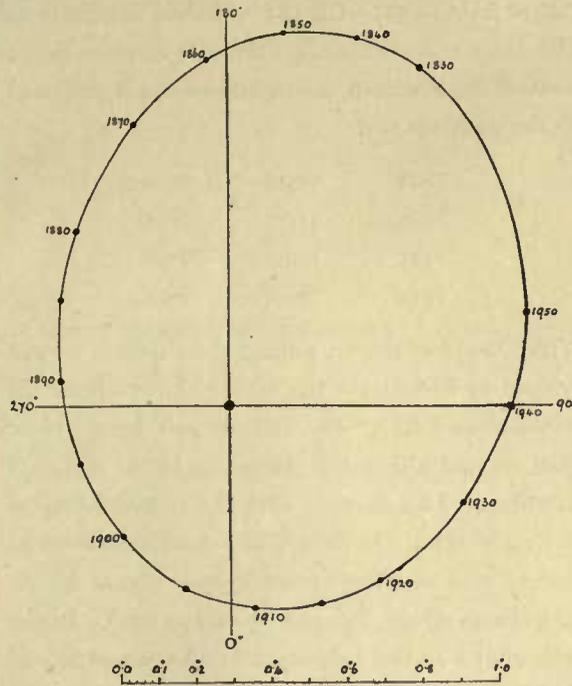
The elements are:—

T 1900.39	a 0.783	i 34.3
P 154.5 years	e 0.387	Ω 0.6
n +2°.33		ω 316.7

Ephemeris.

1830	150.0	1.020
1840	160.4	1.021
1850	171.1	0.986
1860	183.2	0.908
1870	198.4	0.782
1880	220.9	0.613
1885	237.9	0.525
1890	261.2	0.451
1895	290.6	0.420
1900	320.6	0.439
1905	346.1	0.486
1910	7.0	0.534
1915	24.8	0.572
1920	40.5	0.604
1925	54.6	0.635
1930	67.5	0.669
1940	89.4	0.743
1950	107.2	0.825

Apparent Orbit of Σ 2107.



Comparison of Observations with Ephemeris:—

Observed.		Obs.—Comp.	
1829.01	148.6 1.13 Σ 3	-0.4	+1.11
1836.54	156.4 1.26 Σ 3	-0.4	+2.4
1841.04	162.4 1.07 OΣ 4	+0.9	+0.5
1846.41	166.9 0.88 Ma 6	-0.3	-1.2
1851.24	169.5 0.80 OΣ 8	-3.0	-1.8
1857.18	174.2 0.93 OΣ 5	-5.4	.00
1863.00	188.2 0.73 Δ 9	+0.8	-1.5
1863.02	183.0 0.90 OΣ 5	-4.4	+0.2
1865.08	189.2 0.74 Δ 12	-1.0	-1.1
1867.11	189.5 0.87 Δ 8	-4.1	+0.5
1868.88	194.1 0.91 Δ 8	-2.4	+1.1
1870.84	199.2 0.79 Δ 10	-0.7	+0.2
1872.91	205.5 0.78 Δ 9	+1.8	+0.5
1874.25	210.3 0.73 OΣ 3	+3.9	+0.2
1875.03	210.6 0.74 Δ 8	+2.5	-0.4
1877.06	212.3 0.71 Δ 11	-0.6	+0.5
1877.51	220.6 0.69 OΣ 3	+6.5	+0.4
1878.57	216.1 0.65 Δ 4	-0.8	+0.2
1879.59	219.9 0.55 Hl. 3	+0.1	-0.8
1881.53	228.6 0.43 Hl. 2	+2.8	-1.5
1882.51	234.0 0.50 Sp. 6	+4.8	-0.6
1883.60	235.7 0.45 Sp. 7	+3.0	-1.0
1884.78	238.5 0.37 Sp. 5	+1.4	-1.6
1886.56	242.3 0.55 Sp. 4	-2.2	+0.5
1887.51	244.6 0.47 Sp. 8	-2.3	-0.1
1888.60	254.0 0.37 Hl. 2	+0.2	-1.0
1895.29	296.2 0.36 Bar. 3	+3.9	-0.6
1897.03	291.6 0.46 Gr. 8	-10.7	+0.4
1897.35	307.6 0.37 A. 3	+2.9	-0.7
1899.38	318.7 0.38 A. 4	+1.7	-0.6
1901.52	329.3 0.30 Gr. 11	+1.4	-1.5
1901.55	330.2 0.39 A. 6	+2.2	-0.6
1903.47	346.9 0.41 A. 2	+7.7	-0.6
1905.00	359.8 0.37 Gr. 6	+13.7	-1.2
1905.44	351.3 0.31 A. 1	+3.3	-1.8
1906.36	356.5 0.45 A. 3	+4.3	-0.5
1907.63	357.6 0.52 A. 2	+0.3	+0.1
1908.90	6.7 0.46 Gr. 8	+4.3	-0.6
1910.36	11.2 0.54 A. 1	+2.8	.00
1912.58	15.2 0.54 A. 2	-1.4	-0.2
1912.99	18.5 0.52 Gr. 16	0.0	-0.4
1913.53	18.5 0.79 Bies. 3	-1.8	+2.3
1914.49	20.6 0.68 Bies. 3	-2.5	+1.1
1916.75	20.5 0.57 J 3	-10.5	-0.1
1918.70	29.7 0.63 Lv. 5	-7.1	+0.3
1919.60	31.6 0.59 Gr. 2	-7.7	-0.1

7936.

O Σ 327.

B.D. 56°, 1959.

R.A. 17^h 12^m 43^s. Mags. 7.6, 7.9.
Dec. +56° 13'.

The orbit of this binary appears to be similar to that of β .G.C. 4355=O Σ 185. Modern observations with large refractors show a definite increase in the position angle and in the separation, as is indicated by the positions :—

1891	301.3	0.22
1898	313.6	0.32
1905	320.6	0.38
1912	326.0	0.42

With the aid of the arc joining these points, we can proceed to investigate the earlier observations. It would clearly be a very difficult pair before 1890. First we find a doubtful elongation in the direction 90°, observed by Perrotin with the 15-inch refractor at Nice in 1886. As most of the observations—even modern ones with large instruments—appear doubtful as to quadrant, this can be read as 270°. In the orbit shown in the diagram we find the position at that time 282°, 0".14, which sufficiently explains the observation. In 1885, when Perrotin failed to separate the components, and in 1878, when Burnham failed, the separation would be about 0".10. Proceeding to still earlier observations, we find that it was too difficult for Dembowski in 1866. For the orbit adopted here, the separation at that date was 0".28 in position angle 0°. It would certainly be a difficult object for Dembowski's 7-inch telescope, but it is not improbable that that exceptional observer would have noted an elongation had it been so large as 0".28. The orbit might be altered to give a smaller separation at that date by increasing the separation between 1875 and 1885.

Finally, we come to the positive observations of Otto Struve and Maedler, who each observed it on four nights between 1842 and 1850. The means of their position angles are :—

O Σ	1846.45	340.6
Ma	1844.37	159.7

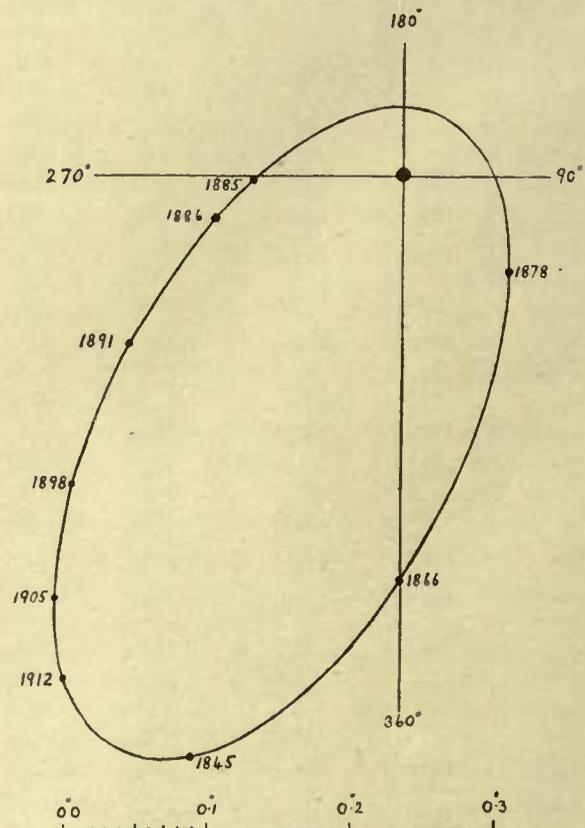
It is seen that these two observers differ as to the quadrant, and the question is, which of the two are in agreement with that adopted for the modern observations? We have decided to adopt the quadrant given by Otto Struve, for two reasons. (1) He had the larger telescope; (2) the adoption of this quadrant allows of the pair remaining really difficult for a longer time. If Maedler's quadrant

were correct, the pair could not have been so close as 0".1 at the times of the negative observations by Burnham and Perrotin, and the separation at the time of Dembowski's observation would not have been less. We thus come to the conclusion that the companion was in 1912 within 14° of the position in which it was in 1845. However, as the companion is near apastron, in that position it will take 20 years to complete the revolution. The period may therefore be about 88 years, although there is a possibility that it is twice as long.

It has not been considered worth the labour of computing the elements from the orbit which has been drawn. It may be said, however, that the eccentricity of the true orbit is near 0.80, and that the semi-major axis is about 0".26. This pair should be carefully observed to determine whether the angle is increasing, as predicted. The positions should be roughly :—

1920	331.3	0.44
1930	337.8	0.44

The above figures give a hypothetical parallax of 0.104.

Apparent Orbit of O Σ 327.

8380.

Σ 2281.

R.A. 18^h 5^m 50^s.
Dec. +3° 58'.

Mags. 5.7, 7.2.
Spec. F2.

P.M. ".039 in 107°·8 (Boss).

From the observations the following positions were deduced :—

1830	259°·0	1°·50
1845	256°·6	1°·39
1860	253°·7	1°·23
1875	250°·0	1°·01
1890	242°·7	0°·65
1896	235°·5	0°·44
1902	215°·1	0°·21
1908	111°·1	0°·17
1913	83°·4	0°·33
1918	75°·5	0°·45

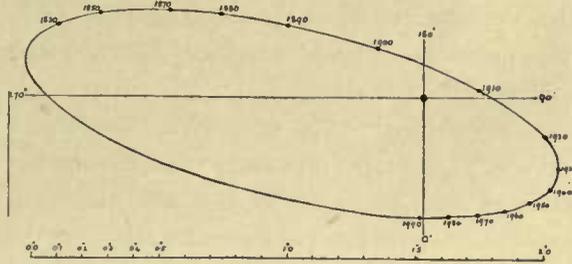
It was at first thought undesirable to compute an orbit, as the observations do not cover the maximum separation which must have taken place long before 1830, and as the motion at the present time is very rapid, so that soon the portion of the apparent orbit observed will have considerably increased. The following elements were deduced at the suggestion of Professor H. N. Russell, who had previously computed an orbit (*Publ. Amer. Astr. Soc.*, 3, 329, or *Pop. Astr.*, xxv., 668). The period given below is nearly double that found by Russell, but the hypothetical parallaxes are approximately equal :—

T 1910·0	a 1°·33	i 73°·7	} Equinox 1900
P 423·5	e 0°·70	Ω 71°·1	
n -0°·85		ω 60°·1	

Ephemeris (Equinox of Date).

1830	259°·0	1°·454
1840	257°·5	1°·389
1850	255°·8	1°·305
1860	253°·8	1°·191
1870	251°·3	1°·045
1880	247°·9	0°·854
1890	242°·0	0°·598
1895	236°·3	0°·440
1897·5	231°·5	0°·353
1900	223°·3	0°·263
1902·5	207°·1	0°·177
1905·0	169°·4	0°·121
1907·5	121°·1	0°·145
1910·0	97°·1	0°·221
1912·5	85°·9	0°·305
1915·0	79°·5	0°·381
1917·5	75°·0	0°·444
1920·0	71°·6	0°·495
1922·5	68°·7	0°·533
1925·0	66°·2	0°·562
1930	61°·7	0°·596
1940	53°·5	0°·609
1950	44°·9	0°·581
1960	35°·3	0°·542
1970	24°·5	0°·506

Apparent Orbit of Σ 2281.



Comparison of Observations with Ephemeris :—

Observed.		Obs.—Comp.	
1783·32	267°·2	H. 1	+ 1°·9
1802·38	264°·7	H. 1	+ 1°·8
1831·05	259°·7	Σ 3	+ 0°·9
1837·72	259°·8	Σ 4	+ 1°·9
1841·18	256°·3	Ma 10	- 1°·0
1842·88	256°·7	Ma 25	- 0°·3
1846·44	256°·0	Ma 4	- 0°·5
1851·38	254°·5	Ma 6	- 1°·1
1855·17	253°·1	Ma 10	- 1°·7
1855·69	253°·9	Δ 4	- 0°·8
1856·81	253°·7	Ma 14	- 0°·8
1860·48	252°·3	Ma 11	- 1°·4
1867·67	253°·2	Δ 6	+ 1°·2
1875·61	250°·4	Sp. 5	+ 0°·7
1877·71	248°·3	Sp. 6	- 0°·5
1884·21	248°·3	Per. 9	+ 2°·4
1884·23	245°·3	Hl. 6	- 0°·6
1886·21	244°·9	Per. 6	+ 0°·2
1895·73	236°·5	Com. 9	+ 1°·3
1896·60	229°·2	Gr. 2	- 4°·3
1897·20	231°·3	A. 5	- 1°·1
1899·68	239°·4	Gr. 2	+ 15
1900·58	224°·8	Gr. 3	+ 4
1901·63	236°·2	Gr. 1	+ 21
1902·58	228°·6	Gr. 2	+ 22
1903·63	233°·0	Gr. 2	+ 40
1905·68	145±	A. 3	- 11
1905·70	196°·2	Gr. 2	+ 40
1907·47	110°·4	A. 1	- 11
1907·58	128°·6	Gr. 1	+ 9
1908·47	98°·9	A. 2	- 10
1909·59	114°·7	Gr. 3	+ 4·7
1909·67	97°·6	A. 2	- 1·8
1910·54	94°·4	A. 2	+ 0·4
1910·70	119°·4	Gr. 2	+ 26·3
1911·54	84°·4	Gr. 2	- 4·9
1911·58	86°·7	A. 3	- 2·3
1912·56	85°·0	A. 2	- 0·6
1912·78	78°·2	Gr. 2	- 6·8
1913·53	86°·3	Bies. 3	+ 3·4
1913·65	75°·4	Gr. 1	- 7·3
1914·49	85°·8	Bies. 4	+ 5·2
1915·62	75°·1	Gr. 3	- 3·2
1918·68	75°·2	Lv. 5	+ 2·0
1919·62	73°·3	Lv. 5	+ 1·3

9319.

Σ 2525.

B.D. 27°, 3391.

R.A. 19^h 23^m 29^s.

Mags. 7.4, 7.6.

P.M. ".127 in 46°·6 (Greenwich).

Dec. +27° 10'.

Spec. F8.

Par. Abs. Trig. ".019 (Sproul).

Although the position angle has changed by 310° since the observations of Struve, the period is still very uncertain. Orbits by Gore, Bowyer, and Doberck give periods of 138.5, 306.7, and 243.9 years respectively. The orbit given here has a period of 354.9 years. For many years to come the predicted position angles of the new orbit will sensibly agree with those of Doberck's orbit, but the distances will differ considerably. Improvement of the elements will largely depend on accurate measurement of the separation. The separation was 1".3 at discovery; it steadily decreased till 1887, when the star appeared single in all telescopes; it is now approaching 1", and will for long continue to increase. The eccentricity is very large: it is quite definitely greater than 0.9.

The shape and position (but not the size) of the apparent orbit has been deduced from the following normal places:—

1830	256°·3	1"·33
1860	244°·4	0"·88
1880	220°·0	0"·40
1892	340°·5	0"·29
1917	303°·7	0"·98

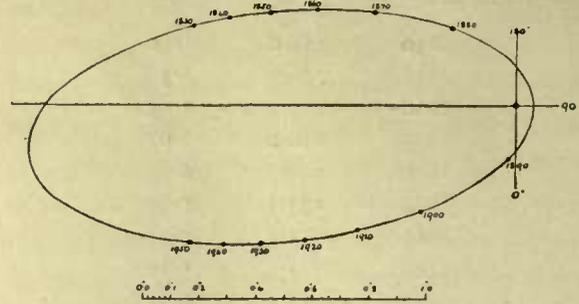
The final elements are:—

T 1887·31	a 1"·205	i 37°·5
P 354·9 years	e 0·933	Ω 1°·0
n -1°·014		ω 93°·4

Ephemeris.

1830	256°·2	1"·257
1840	253°·3	1"·138
1850	249°·7	1"·000
1860	244°·7	0"·838
1870	236°·9	0"·639
1875	230°·6	0"·520
1880	220°·0	0"·376
1885	190°·7	0"·181
1890	352°·6	0"·201
1895	327°·4	0"·399
1900	317°·9	0"·544
1905	312°·1	0"·666
1910	308°·0	0"·770
1915	304°·9	0"·865
1920	302°·3	0"·949
1930	298°·3	1"·099
1940	295°·2	1"·225
1950	292°·6	1"·335

Apparent Orbit of Σ 2525.



Comparison of Observations with Ephemeris:—

Observed.		Obs.—Comp.	
1830·43	255°·9 1"·33 Σ 5	- 0°·2	+ 0"·08
1836·14	255°·5 1"·30 Σ 2	+ 0°·9	+ 0"·11
1840·70	252°·4 1"·28 O Σ 2	- 0°·7	+ 0"·15
1843·05	252°·5 0"·88 Ma 2	+ 0°·2	- 0"·22
1854·63	246°·8 1"·05 O Σ 1	- 0°·9	+ 0"·12
1856·61	247°·1 0"·85 Se 2	+ 0°·5	- 0"·05
1865·22	240°·9 0"·6 \pm Δ 7	- 0°·4	- 0"·14
1865·76	241°·5 0"·74 O Σ 2	+ 0°·8	+ 0"·01
1872·61	234°·0 0"·66 O Σ 1	+ 0°·1	+ 0"·07
1873·61	233°·4 0"·6 \pm Δ 4	+ 0°·8	+ 0"·04
1875·65	232°·1 0"·45 Sp. 5	+ 2°·6	- 0"·06
1877·01	230°·1 0"·37 Sp. 5	+ 2°·9	- 0"·10
1879·71	213°·2 0"·33 Hl. 3	- 7°·6	- 0"·06
1880·67	217°·8 0"·32 Sp. 8	0°·0	- 0"·03
1883·63	200°·0 0"·35 Sp. 4	- 3°·5	+ 0"·11
1889·78	24°·1 0"·15 H Σ 1	+ 26°	- 0"·05
1891·46	343°·4 0"·18 β 4	+ 2°·0	- 0"·09
1893·80	329°·6 0"·31 Com. 3	- 1°·5	- 0"·04
1895·68	327°·3 0"·38 Com. 3	+ 1°·8	- 0"·04
1896·3	327°·6 0"·46 Gr. 6	+ 3°·3	+ 0"·03
1897·60	322°·2 0"·48 A. 3	+ 0°·6	+ 0"·01
1898·1	321°·3 0"·43 Gr. 9	+ 0°·5	- 0"·06
1899·62	319°·9 0"·46 A. 3	+ 1°·4	- 0"·07
1899·9	319°·3 0"·45 Gr. 9	+ 1°·3	- 0"·09
1902·4	314°·3 0"·50 Gr. 10	- 0°·5	- 0"·10
1903·53	307°·8 0"·78 Lohse 4	- 5°·7	+ 0"·15
1903·61	317°·5 0"·58 Bies. 5	+ 4°·1	- 0"·05
1905·3	311°·9 0"·61 Gr. 8	+ 0°·1	- 0"·06
1905·46	310°·9 0"·54 A. 1	- 0°·7	- 0"·13
1908·6	307°·7 0"·68 Gr. 13	- 1°·3	- 0"·06
1911·44	307°·6 0"·76 A. 2	+ 0°·6	- 0"·04
1911·5	305°·4 0"·71 Gr. 12	- 1°·6	- 0"·09
1913·40	309°·4 0"·87 V 2	- 3°·7	+ 0"·03
1914·3	305°·7 0"·84 Gr. 11	+ 0°·5	- 0"·01
1915·68	306°·0 0"·78 Lv. 4	+ 1°·5	- 0"·09
1918·71	306°·3 0"·92 Lv. 6	+ 3°·4	0"·00
1919·6	302°·1 0"·89 Gr. 1	- 0°·4	- 0"·05
1919·66	303°·8 1"·06 Lv. 1	+ 1°·3	+ 0"·12
1920·57	304°·9 0"·90 Dob. 3	+ 2°·8	- 0"·06

9605.

Σ 2579.

B.D. 44°, 3234.

R.A. 19^h 42^m 38^s.

Mags. 3.0, 7.9.

P.M. ".066 in 55°.1 (Boss).

Dec. +44° 56'.

Spec. A.

Abs. Trig. Par. ".055 (Sproul).

The arc described is not yet sufficient for an accurate determination of the orbit. Only about 110° have been described by the companion since Struve's time. Herschel made a single observation in 1783, but he says it is not very good. Yet as this observation extends the arc by 32° and the time interval by nearly 50 years, it must be considered in the determination of an orbit. The elements given below can only be considered to be approximate, although they fit the observations very well.

The apparent orbit is based on the following positions (referred to the equinox of 1900):—

1783.72	70.8	2.51
1830.0	38.7	1.92
1860.0	359.7	1.54
1885.0	321.7	1.56
1916.0	282.1	1.79

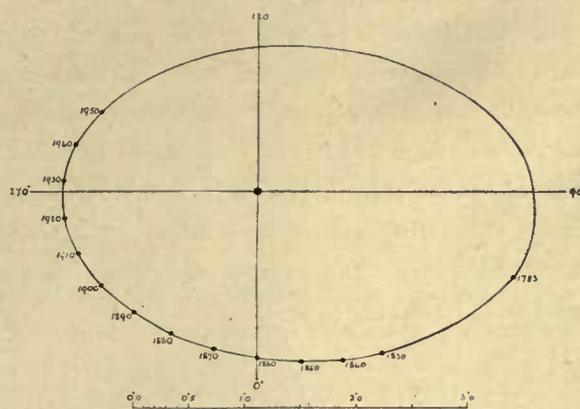
The elements are:—

T 1941.6	a 2".12	i 47.8
P 321.0 years	e 0.188	Ω 87.9
n -1°.122		ω 159.0

Ephemeris (Equinox of Date).

1783.7	72.9	2.410
1830	38.5	1.828
1840	27.6	1.685
1850	14.9	1.562
1860	0.4	1.479
1870	344.7	1.449
1880	329.0	1.474
1890	314.3	1.540
1900	300.9	1.625
1910	288.8	1.700
1920	277.6	1.742
1930	266.6	1.737
1940	255.1	1.674
1950	242.4	1.566

Apparent Orbit of Σ 2579.



Comparison of Observations with Ephemeris:—

	Observed.			Obs.—Comp.		
1783.72	71.6	..	H. 1	-1.3	..	
1830.21	37.9	1.78	Σ 6	-0.4	-0.5	
1836.52	31.9	1.80	Σ 4	+0.3	+0.7	
1844.78	19.6	1.68	OΣ 3	-2.2	+0.6	
1852.70	8.4	1.51	OΣ 3	-2.7	-0.2	
1858.71	3.4	1.65	OΣ 3	+1.0	+1.6	
1863.74	353.8	1.61	OΣ 3	-0.9	+1.5	
1867.60	348.5	1.55	Δ 7	0.0	+1.0	
1870.57	342.9	1.47	Δ 7	-1.0	+0.2	
1872.81	341.7	1.47	OΣ 2	+1.4	+0.2	
1878.59	328.2	1.56	Δ 3	-2.9	+0.9	
1885.73	322.7	1.46	Hl. 4	+2.3	-0.5	
1888.93	318.1	1.45	Hl. 4	+2.3	-0.8	
1890.57	310.1	1.52	Hl. 4	-3.4	-0.2	
1894.95	308.1	1.64	Com. 11	+0.6	+0.6	
1897.31	303.6	1.65	Hu. 9	-0.8	+0.5	
1899.5	303.8	1.37	Gr. 5	+2.3	-2.5	
1900.42	299.8	1.63	Lohse 3	-0.6	0.0	
1905.64	294.5	1.64	β 4	+0.5	-0.3	
1910.91	289.8	1.54	V 2	+2.0	-1.6	
1911.54	287.5	1.61	V 5	+0.5	-1.0	
1912.58	281.4	2.04	Fox 5	-4.5	+3.3	
1912.72	286.8	1.81	V 5	+1.1	+1.0	
1914.0	281.0	1.56	Gr. 4	-3.3	-1.6	
1914.10	287.6	1.73	Bies. 2	+3.4	+0.1	

9650.

OΣ 387.

B.D. 34°, 3727.

R.A. 19^h 45^m 55^s.
Dec. +35° 7'.

Mags. 7.2, 8.2.
Spec. F5.

P.M. ".119 in 44°.9 (Porter).
Par. Abs. Trig. ".021 (Sproul). Spec. ".017.

Apparent Orbit of OΣ 387.

This was rather a difficult pair for the early observers, and the observations do not appear to be very accurate. The total arc described since 1844 is about 170°. The orbits obtained by Glasenapp, Doberck, and Lohse show periods from 75 to 260 years. The period is probably of the order of 130 years. The minimum separation of 0".4 was reached about the time of Dembowski's earlier observations, and the maximum separation of 0".6 seems to have occurred about 1903. The pair will therefore always be a fairly difficult one for any but the largest telescopes. The apparent orbit has been based on the following data:—

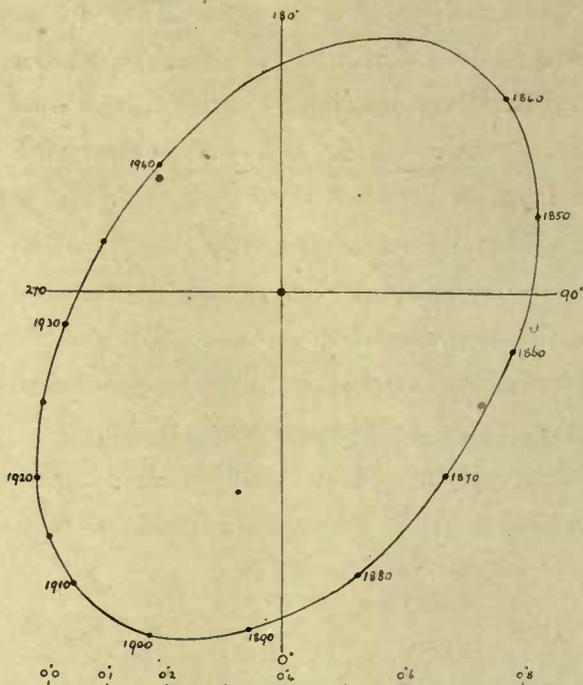
1843	123.0	0.49
1861	72.5	0.40
1879	16.4	0.48
1897	343.5	0.61
1915	316.6	0.57

The elements are:—

T	1946.7	a 0".566	i 51.5
P	128.0 years	e 0.179	Ω 146.4
n	-2°.813		ω 55.0

Ephemeris.

1840	130.6	0.501
1845	119.2	0.482
1850	106.6	0.452
1855	92.1	0.422
1860	75.7	0.402
1865	58.3	0.399
1870	41.5	0.415
1875	26.6	0.448
1880	14.0	0.488
1885	3.4	0.532
1890	354.3	0.572
1895	346.3	0.602
1900	338.9	0.619
1905	331.7	0.621
1910	324.4	0.604
1915	316.4	0.569
1920	307.1	0.515
1925	295.1	0.446
1930	278.4	0.372
1935	254.3	0.313
1940	223.8	0.299



Comparison of Observations with Ephemeris:—

Observed.	Obs.—Comp.
1844.18	120.8 0.50 OΣ 2 - 0.7 +.01
1847.73	119.4 0.60 Ma 1 + 6.9 +.14
1851.97	101.6 0.47 OΣ 3 + 0.5 +.03
1853.75	89.7 0.53 Da 3 - 6.1 +.10
1855.63	89.2 0.57 OΣ 2 - 1.0 +.15
1861.22	73.2 0.60 OΣ 2 + 1.7 +.20
1865.53	56.2 .. Δ 2 - 0.3 ..
1869.92	52.5 .. Δ 3 + 10.8 ..
1871.57	39.6 .. Δ 1 + 3.1 ..
1872.55	26.6 .. Δ 1 - 7.1 ..
1873.72	23.0 .. Δ 6 - 7.2 ..
1874.57	20.7 0.55 Δ 5 - 7.1 +.10
1875.41	22.0 0.34 Δ 3 - 3.5 -.11
1877.67	17.7 0.46 Δ 2 - 1.9 -.01
1878.20	17.5 0.48 Hl. 7 - 0.8 +.01
1881.61	10.6 0.52 Hl. 3 + 0.2 +.02
1882.70	11.3 0.44 Hl. 2 + 3.3 -.07
1883.63	8.9 0.54 Hl. 3 + 2.8 +.02
1884.69	6.1 0.56 Hl. 3 + 2.1 +.03
1886.18	4.0 0.53 Hl. 8 + 2.8 -.01
1889.19	357.2 0.53 Hl. 8 + 1.5 -.03
1890.62	355.9 0.58 Hl. 3 + 2.6 +.01
1892.98	350.9 0.55 Com. 7 + 1.5 -.04
1896.19	345.1 0.57 Com. 6 + 0.5 -.04
1898.7	343.0 0.50 Gr. 9 + 2.2 -.11
1898.83	340.8 0.60 Hu. 7 + 0.2 -.01
1900.54	337.4 0.60 Doo. 4 - 0.7 -.02
1900.62	336.6 0.72 Dob. 3 - 1.4 +.10
1902.58	335.4 0.64 Hu. 3 0.0 +.02
1903.58	332.1 0.73 Lohse 3 - 1.7 +.11
1903.69	334.2 0.68 Bies. 3 + 0.6 +.06
1903.9	328.6 0.54 Gr. 5 - 4.7 -.08
1904.66	333.3 0.76 Lohse 2 + 1.1 +.14
1905.56	331.3 0.73 Lohse 3 + 0.4 +.11
1905.69	329.7 0.64 Doo. 3 - 1.0 +.02
1906.54	325.7 0.88 Lohse 3 - 3.7 +.26
1909.7	324.4 0.53 Gr. 6 - 0.5 -.07
1912.68	320.4 0.66 Fox 3 + 0.1 +.07
1913.4	316.7 0.52 Gr. 10 - 2.4 -.06
1915.67	317.6 0.50 Dob. 2 + 2.4 -.06
1918.71	309.9 0.44 Dob. 3 + 0.2 -.09
1918.72	311.4 0.67 Lv. 4 + 1.7 +.16
1920.54	302.8 0.59 Dob. 4 - 3.2 +.08

10,559.

Σ 2729.

B.D. -6°, 5604.

R.A. 20^h 47^m 27^s.

Mags. 5.9, 7.2.

P.M. "090 in 97°0 (Boss).

Dec. -5° 54'.

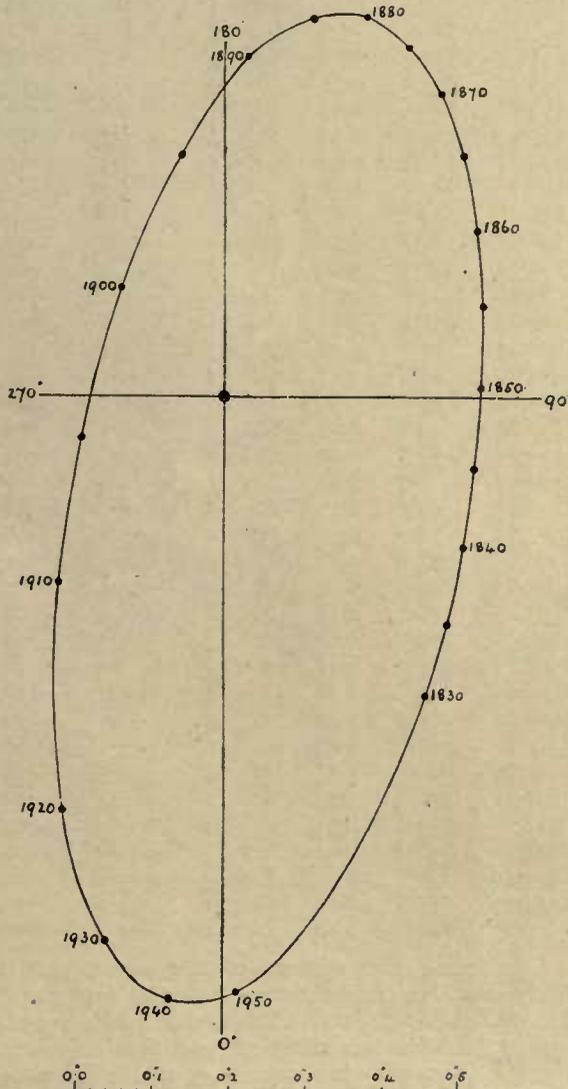
Spec. F.

There are recent orbits of this pair by Aitken (*Publ. A.S.P.*, 21, 84, and *Publ. L.O.*, 12, 153) and Doberck (*A.N.*, 190, 199) giving periods of 135.6 and 646.5 years respectively. Both orbits fit the modern observations within their probable errors. The difference arises in the way the early observations are treated. The discordances in the observed angles are enormous, amounting to 60°. Aitken rejected all the observations of Maedler, the observations by Herschel in 1802, and the observations by Struve in 1830, 1832, 1833. His orbit is based on the observations by Struve in 1825, by Sir John Herschel in 1832, and the considerable series of observations by Dawes from 1839 to 1854. The early observation of Herschel in 1783 is shown with a residual of 13°.2. Doberck, on the other hand, attempted to use all the observations, and the result shows probable errors of 8°.6 in Struve, 19°.5 in Dawes, and 12°.2 in Maedler, although the residuals are in many cases much larger and systematic for the two latter observers. The 1783 observation of Herschel is represented to 15°.4 in the opposite direction from Aitken's orbit. The separation in 1783 was 0".56 according to Aitken and 1".47 according to Doberck. It is 0".78 according to the orbit given below. It was probably at least as large as this at that epoch.

The following elements were deduced by Zwiers' method :

T 1897.22	a 0.695	i 67.4
P 151.7 years	e 0.375	Ω 167.8
n +2°.374		ω 59.7

Apparent Orbit of Σ 2729.



Ephemeris (Equinox of Date).

1783.55	351.9	0.776	1892.5	182.1	0.384
1802.66	4.4	0.758	1895	190.3	0.322
1825	26.1	0.534	1897.5	202.8	0.255
1830	34.2	0.473	1900	223.2	0.198
1835	44.6	0.416	1902.5	254.7	0.173
1840	57.8	0.370	1905	285.5	0.198
1845	74.0	0.343	1907.5	305.8	0.258
1850	91.9	0.338	1910	317.8	0.328
1855	109.0	0.358	1915	331.0	0.468
1860	123.4	0.397	1920	338.4	0.584
1865	135.0	0.444	1925	343.6	0.673
1870	144.4	0.488	1930	347.6	0.732
1875	152.2	0.520	1935	351.2	0.775
1880	159.5	0.531	1840	354.4	0.794
1885	167.0	0.507	1845	357.6	0.795
1890	176.1	0.447	1850	0.9	0.781

Comparison of Observations with Ephemeris:—

Observed.		Obs.—Comp.	
1783.55	351.5	H. 1	-0.4
1802.66	28.9	H. 1	+24.5
1825.60	27.5	Σ 2	+0.5
1830.92	13.4	Σ 1	-22.5
1832.73	46.0	h. 1	+6.4
1832.90	23.0	Σ 1	-16.9
1833.77	31.2	Σ 1	-10.6
1834.69	45.0	Sm. 1	+1.1
1836.05	46.3	Σ 4	-0.6
1839.68	62.2	Da. 2	+5.3
1840.72	65.5	Da. 2	+5.6
1841.80	72.7	Da. 2	+9.4
1843.76	81.7	Da. 1	+12.0
1853.70	95.9	Da. 1	-7.8
1854.75	101.7	Da. 1	-6.5
1856.81	107.9	Se 1	-6.5
1862.68	137.5	Δ 3	+7.5
1865.88	142.0	Δ 2	+5.2
1866.47	134.6	Δ 1	-3.4
1867.86	141.1	New 1	+0.5
1871.52	141.8	Δ 1	-5.1
1872.69	146.2	Δ 2	-2.6
1873.76	151.7	Δ 2	+1.3
1874.85	149.5	Δ 1	-1.5
1875.62	157.0	Sp. 4	+3.9
1877.84	147.7	Δ 1	-8.6
1878.76	148.9	Δ 1	-8.8
1879.68	157.8	(3) 6	-1.2
1880.78	165.5	Pr. 9	+4.9
1881.54	159.6	β 3	-2.2
1884.77	166.8	Sb. 7	+0.2
1885.74	167.0	Hl. 3	-1.2
1886.76	169.4	(3) 4	-0.6
1887.50	173.5	(3) 12	+2.1
1888.81	172.4	Sp. 5	-1.4
1889.88	176.7	Sp. 2	+0.8
1890.78	178.2	Tar. 2	+0.4
1892.77	184.0	(3) 2	+1.1
1893.81	182.4	Com. 1	-3.7
1894.86	186.5	Sp. 3	-3.2
1895.73	184.2	See 3	-9.3
1895.77	193.5	(2) 5	-0.2
1896.67	194.2	Com. 1	-3.9
1898.63	208.3	(2) 3	-2.5
1899.53	218.3	A. 3	-0.2
1900.73	234.9	A. 3	+3.7
1901.51	240.1	A. 4	-0.8
1901.70	234.0	Gr. 2	-9.5
1902.61	259.5	A. 2	+3.5
1904.62	276.6	A. 2	-5.0
1905.66	285.8	A. 4	-5.6
1906.53	296.9	A. 3	-2.3
1908.66	307.6	A. 2	-4.7
1909.76	326.5	Gr. 1	+9.7
1910.81	322.0	A. 2	+0.9
1912.58	324.2	A. 2	-1.5
1914.00	330.9	Gr. 3	+1.9
1914.56	330.3	Bies. 3	+0.2
1918.44	342.2	Lv. 2	+5.8

The comparison with Maedler's observations (1841-1844) is not given. The observed angles were always 30° to 50° smaller than the computed.

12,290.

β 80.

R.A. $23^h 15^m 2^s$. Mags. 8.2, 9.1.
Dec. $+5^\circ 0'$. Spec. G8.

B.D. $4^\circ, 4994$.

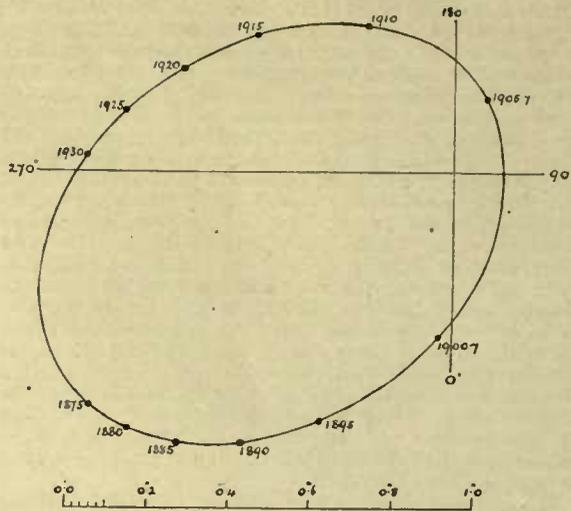
P.M. ".492 in $102^\circ 9$ (Porter).
Par. Abs. Trig. ".011 (4). Spec. ".030.

The latest measures of this pair show an angular motion of 300° since the time of discovery. However, the apastron is not well defined by the early measures. If the early angles were correct the maximum separation would have taken place about 1885, but the measured distances show that the maximum separation took place earlier, probably about the time of discovery in 1875. There are orbits of this binary by See and Aitken, who give periods of 63.5 and 95.2 years. The following elements satisfy the observations pretty well from 1875 to 1919. The orbit was deduced by Zwiers' method.

T 1904.69 a 0.79 i $43^\circ 0$
P 85.7 years e 0.773 Ω 174.1
 n $+4^\circ 201$ ω 288.9

Ephemeris.

1875	303.0	1.059
1880	308.6	1.017
1885	314.9	0.950
1890	322.4	0.847
1892.5	327.0	0.780
1895	332.6	0.696
1897.5	339.9	0.591
1898.7	344.6	0.530
1899.7	349.4	0.474
1900.7	355.6	0.409
1901.7	4.5	0.336
1902.7	18.9	0.252
1903.7	48.2	0.166
1904.7	109.2	0.137
1905.7	156.0	0.200
1906.7	178.3	0.270
1907.7	192.0	0.328
1908.7	201.8	0.376
1910.0	210.6	0.432
1912.5	225.2	0.517
1915.0	235.1	0.592
1917.5	242.9	0.657
1920.0	249.3	0.717
1922.5	254.8	0.772
1925.0	259.6	0.819
1927.5	263.9	0.855
1930.0	267.8	0.900



Comparison of Observations with Ephemeris:—

	Observed.		Obs.—Comp.			
1875.80	300.4	1.07	Δ	4	-3.5	+0.02
1877.79	306.1	1.24	β	2	+0.0	+0.20
1881.69	312.2	0.91	β	3	+1.6	-0.09
1886.94	316.1	0.84	L.M.	1	-1.6	-0.07
1888.71	319.5	0.92	β	4	-0.9	+0.05
1888.79	319.5	0.84	Lv.	3	-1.1	-0.03
1891.57	322.5	0.69	β	3	-2.6	-0.12
1892.97	327.2	0.60	Sp.	3	-0.7	-0.17
1893.54	328.0	0.81	Lv.	1	-1.1	+0.06
1893.66	329.1	0.85	W.	3	-0.2	+0.11
1893.96	325.8	0.55	Sp.	3	-4.3	-0.18
1894.85	325.1	0.63	Gr.	1	-7.1	-0.7
1898.76	347.8	0.56	β	1	+3.0	+0.03
1898.78	343.1	0.62	A.	4	-1.8	+0.09
1898.88	334.8	0.56	Gr.	2	-10.6	+0.04
1899.71	348.1	0.46	Gr.	3	-1.4	-0.01
1900.56	2.8	0.41	Doo.	2	+8.2	-0.01
1900.75	354.4	0.42	A.	2	-1.6	+0.01
1900.93	10.7	0.27	Gr.	1	+13.4	-0.12
1901.79	19.6	0.23	Gr.	3	+14.2	-0.10
1901.84	12.1	0.34	Doo.	2	+6.0	+0.01
1901.88	9.6	0.32	A.	2	+3.1	.00
1902.75	39.3	0.29	Gr.	1	+19.4	+0.04
1902.92	9.3	0.45	Gr.	1	-14.4	+0.22
1903.67	49.5	0.19	A.	3	+1.9	+0.02
1903.88	63.5	0.23	Gr.	2	+6.8	+0.08
1903.95	72.9	0.26	Bies.	1	+10.4	+0.11
1904.73	91.6	0.16	A.	2	-19.2	+0.02
1905.65	136.4	0.17	A.	2	-17.9	-0.03
1906.52	163.7	0.18	A.	3	-11.3	-0.08
1907.67	188.4	0.28	A.	2	-3.2	-0.05
1908.66	202.9	0.30	A.	3	+1.4	-0.07
1909.72	210.1	0.40	A.	3	+0.9	-0.02
1910.81	216.8	0.40	A.	2	+1.1	-0.06
1911.78	222.8	0.45	A.	3	+1.5	-0.04
1911.82	226.2	0.35	Gr.	2	+4.5	-0.14
1912.66	228.4	0.51	A.	4	+2.4	-0.01
1913.79	237.5	0.49	Gr.	1	+6.8	-0.07
1914.10	237.4	0.51	Bies.	3	+5.4	-0.06
1914.73	233.6	0.45	Gr.	1	-0.6	-0.13
1919.67	248.3	0.80	Lv.	2	-0.4	+0.09

Considering the separation, the agreement is fairly close, but the differences are rather systematic and indicate that the orbit might be improved. Where the differences in angle from Aitken's observations are large, the motion is very rapid. In 1904 the angular motion would be about 70° a year.

12,696.

Holden 60.

B.D. 38°, 5112.

R.A. 23^h 57^m 33^s.

Mags. 8.5, 8.9.

Dec. +39° 12'.

The orbit of this binary was investigated by Fox (*Pop. Ast.*, 17, 17), who used the observations to 1909. This was considered to be a more or less uncertain approximation, and in the *Annals of the Dearborn Observatory*, 1, 43, Fox states that it is now (1914) evident that the period will be much longer than the forty years originally found, and that it may well be two or three times as great. The following orbit has been computed with the help of Fox's observations to 1914. The period agrees well with that originally found by Fox, but the other elements do not agree very well. It appears to be impossible to fit satisfactorily both of the single observations of 1893 and 1902. The uncertainty in the elements is largely due to the lack of observations between these dates. The orbit given does not fit the final observations so well as is desirable, and the period may be somewhat longer than forty years, although it should not exceed fifty years.

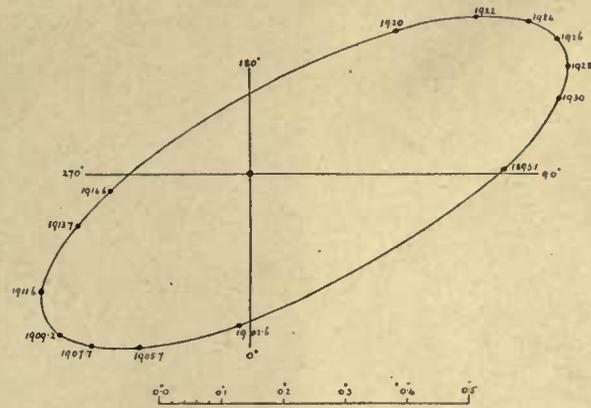
The following elements have been obtained by Zwiers' method :—

T	1915.42	a 0.50	i 69.7
P	40.76	e 0.35	Ω 119.1
n	-8.83		ω 114.2

Ephemeris.

1920.0	134.2	0.332
1922.0	124.7	0.448
1924.0	118.6	0.518
1926.0	113.6	0.547
1928.0	108.9	0.544
1930.0	103.7	0.518

Apparent Orbit of Hn. 60.



Comparison of Observations with Ephemeris:—

	Observed.				Obs.—Comp.	
1881.71	124.1	0.62	β	3	+ 1.0	+ .15
1888.17	105.0	0.54	Com.	2	- 1.5	- .05
1893.13	91.1	0.21	Com.	1	+ 0.2	- .16
1902.62	345.5	0.45	β	1	- 10.7	+ .20
1905.68	331.4	0.28	β	2	+ 3.8	- .06
1906.72	326.7	0.23	β	1	+ 4.5	- .13
1907.69	316.5	0.31	β	1	- 0.7	- .07
1908.03	297.9	0.65	Gr.	1	- 17.5	+ .26
1909.22	306.3	0.26	Fox	2	- 3.7	- .14
1910.78	301.9	0.26	Doo.	2	- 1.1	- .14
1911.59	295.4	0.29	Fox	5	- 4.0	- .09
1912.59	289.6	0.38	Fox	3	- 4.5	+ .03
1913.71	290.2	0.38	Fox	3	+ 3.9	+ .09
1914.64	281.7	0.39	Fox	1	+ 5.5	+ .16

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